United States Court of Appeals
for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

No. 11,008.

JOINT APPENDIX TO BRIEF FOR APPELLANTS.

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT.

DELMAR H. LARSEN, [redacted]
Appellants,

vs.

JOHN A. MARZALL, Commissioner of Patents,
Appellee.

511

Appeal from the United States District Court fo [illegible]
District of Columbia.

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United States Court of Appeals
For the
District of Columbia Circuit

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JOINT APPENDIX.

COMPLAINT.

Filed November 19, 1948.

To the Honorable
The Judges of the United States District Court
For the District of Columbia.

Plaintiff for his Complaint alleges:

1. That plaintiff, Delmar H. Larsen, is a citizen of the United States and a resident of the City of West Hollywood, State of California.

2. That defendant, Lawrence C. Kingsland, is a citizen of the United States, is Commissioner of Patents of the United States, maintains his official residence within the District of Columbia, and is sued in his capacity as Commissioner of Patents of the United States.

3. That this is an action arising under the patent laws of the United States, to-wit, Section 4915, of the Revised Statutes of the United States (Title 28, Section 63, U. S. Code); that no appeal has been taken to the United States Court of Customs and Patent Appeals, and that there are no adverse or opposing parties.

4. That prior to April 17, 1944, plaintiff, Delmar H. Larsen, invented certain new and useful improvements in Employment of Non-Aqueous Well Drilling Fluids, for which he believed himself entitled to Letters Patent of the United States; that plaintiff, having complied with the requirements of the Statutes of the United States in such cases made and provided, filed in the United States Patent Office a certain application for Letters Patent of the United States identified as Serial No. 531,494 on April 17, 1944; that said application contained a written description of said improvements in such full, clear, concise, and exact terms as to enable any person skilled in the art or science

to which it appertains to make, construct, compound, and use the same, and said applications particularly pointing out and distinctly claiming the subject-matter upon which he believed himself entitled to Letters Patent, all of which will fully appear from a duly authenticated copy of said application produced in Court.

5. That thereafter such proceedings were had that said application Serial No. 531,494 was finally rejected by the Patent Office by the Examiner in the Patent Office in charge thereof; that thereupon plaintiff within six months from said final rejection appealed from said Examiner to the Board of Appeals in the Patent Office, complying in all respects with the provisions of the Patent Statute R. S. 4909 (Title 28, Section 57, U. S. Code), and the rules in such cases made and provided; that the Examiner rendered a written Statement purporting to set forth the grounds of his decision and all points involved in the appeal and furnished a copy thereof to plaintiff; that thereafter, to-wit: on May 21, 1948, the Board of Appeals rendered a decision affirming the Examiner and refusing plaintiff Letters Patent upon the subject-matter described in said application and particularly pointed out and distinctly claimed in said claims 1 through 7; all of which will appear from the file of said application, Serial No. 531,494, in court to be produced and of which plaintiff makes profert.

6. That said claims 1 through 7 so refused by the Patent Office set forth the disclosure of the subject-matter of plaintiff's application Serial No. 531,494, which is in the secret archives in the Patent Office and in accordance with Rule 15 of the Patent Office are and should be preserved in secrecy, and that under Section 4908 of the Revised Statutes (35 U. S. C. 56) plaintiff can refuse to disclose their subject-matter; said claims are, however, of record in said application, Serial No. 531,494, and the amendments thereto, which will be produced in court at the trial and plaintiff makes profert of the same.

7. That in consequence thereof, defendant has refused and still refuses to grant Letters Patent on said application as prayed for in said application, Serial No. 531,494, on said claims 1 through 7, which are germane to the subject-matter now in issue and for which plaintiff was legally entitled to Letters Patent.

Wherefore, plaintiff demands judgment against the defendant, the Commissioner of Patents, ordering and requiring the defendant to grant unto plaintiff the Letters Patent on claims 1 through 7 prayed for in the aforesaid application, Serial No. 531,494, and which are germane to the subject-matter, as this Court may deem meet.

Delmar H. Larsen,
Bruninga & Sutherland,
By John H. Bruninga,
His Attorneys,
1004 Market Street,
St. Louis, Missouri.

St. Louis, Mo., November 17, 1948.

Richard G. Radue,
Of Counsel,
National Press Building,
Washington, D. C.

ANSWER TO COMPLAINT.

Filed January 10, 1949.

To the Honorable the Judges of the United States District Court for the District of Columbia.

1, 2, 3. Defendant admits the allegations of paragraphs 1, 2, and 3.

4. He admits that on April 17, 1944, plaintiff, claiming to have invented certain alleged new and useful improve-

ments in Employment of Non-Aqueous Well Drilling Fluids filed in the Patent Office an application for patent thereon to which Serial No. 531,494 was given. He admits that said application contained a written description of the alleged invention in form sufficient to comply with the formal requirements of law but he denies for the reasons hereinafter given that plaintiff is entitled to receive a patent on the said application.

5. He admits the allegations of paragraph 5.

6. He admits that claims 1 to 7, inclusive, of said application are based upon the subject matter disclosed in said application but denies that said claims set forth the disclosure of said application. He denies that plaintiff in an action under Section 4915 R. S. can refuse to disclose the subject matter of said claims. He admits that plaintiff should produce at the trial copies of said application including all the proceedings thereon in the Patent Office.

7. He admits that he has refused and still refuses to issue to plaintiff a patent containing any of claims 1 to 7, inclusive, of said application. He denies that plaintiff is lawfully entitled thereto. He states that said claims are unpatentable in view of the following prior patterns and for the reasons given by the Examiner in his Statement dated July 31, 1947, and in his Reply dated November 19, 1947, and by the Board of Appeals in its decision dated May 21, 1948, copies of which patents will be furnished at the trial.

Miller	2,316,967	April 20, 1943
Miller	2,316,968	April 20, 1943
Miller	2,356,776	Aug. 29, 1944

Profert of copies of the above cited patents is hereby made.

W. W. Cochran,
Solicitor, U. S. Patent Office,
Attorney for Defendant.

January 7, 1949.

MEMORANDUM OPINION OF DISTRICT COURT.

Filed November 9, 1950.

This is an action under R. S. 4915 (35 U. S. C. 63), in which the plaintiff seeks to have the court authorize the Commissioner of Patents to allow claims 1 to 7, inclusive, of the plaintiff's application, which claims were refused by the Board of Appeals. Claims 1 and 5 are typical:

> "Claim 1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss."
>
> "Claim 5. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite in an amount sufficient to substantially reduce the filtration loss."

The plaintiff's application relates to the employment of non-aqueous well drilling fluids. It discloses the use of a fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite. A sufficient amount of it is used to substantially reduce the filtration loss. The application discloses also the addition of other ingredients to the fluid.

The patent to Miller (No. 2,316,968) relates to an oil base drilling fluid and discloses the use of such a fluid, among other ingredients of natural asphalts, such as gilsonite, glance pitch, and some types of grahamite.

The plaintiff concedes that it was old in the prior art to use blown asphalt in drilling fluids, and also to use natural asphalt. At the trial plaintiff's counsel conceded that for the purposes of this case the subject matter of the claims at bar is disclosed in the Miller patents, Nos. 2,316,967, 2,316,968, and 2,356,776. The plaintiff may overcome these patents by showing a conception and a completion of the invention before such filing dates, but an invention is not completed until it has been both conceived and reduced to practice. At the trial the plaintiff's testimony that he conceived invention before the Miller patents was corroborated but his testimony as to having reduced it to practice before the dates of the Miller patents was not corroborated. He did testify as to certain laboratory tests and results, but did not show any reduction to practice by actual use in a well. In my opinion the laboratory tests would not be a sufficient reduction to practice, and even as to these tests his evidence is not corroborated. While it is true that in the case of **Mathieson Alkali Works, Inc., v. Crowley**, 78 U. S. App. D. C. 163, 138 F. 2d 281, the court took the position that the practice of the Patent Office in requiring corroboration of testimony of reduction to practice was not binding upon the courts, and that the court might rely upon the testimony solely of the plaintiff, in the instant case, in my opinion, there was no sufficient corroboration of reduction to practice by the plaintiff even though the laboratory experiments if properly proven might be a sufficient reduction to practice. And it may be added that the fact that plaintiff waited for three years before filing his application weakens the effect of his testimony.

I find therefore that the plaintiff has not established any reduction to practice before the date of the Miller patents, and therefore I agree with the action of the Board of Appeals of the Patent Office in refusing to grant the plaintiff's application. The suit will be dismissed with costs to the plaintiff.

(s) Jennings Bailey,
Judge.

FINDINGS OF FACT.

Filed December 20, 1950.

1. This is an action under R. S. 4915 (35 U. S. C. 63) in which the plaintiff seeks to have the Court authorize the allowance of claims 1 to 7, inclusive, of his application Serial No. 531,494, for the Employment of Non-Aqueous Well Drilling Fluids, which claims were refused by the Board of Appeals. Typical claims are the following:

> Claim 1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.
>
> Claim 5. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite in an amount sufficient to substantially reduce the filtration loss.

2. The plaintiff's application in suit relates to the drilling of wells by the rotary system of drilling by an oil-base well drilling fluid. It discloses such oil-base drilling fluid containing an oil, a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite. A sufficient amount is used to substantially reduce the filtration loss. The application discloses also the addition of other ingredients such as suspending agents and weighting materials.

3. The patent to Miller No. 2,316,968 relates to an oil base drilling fluid and discloses the use in such a fluid of air blown asphalt, mineral rubber, another name for air

blown asphalt, to reduce the filtration losses, suspending agents, weighting materials and natural asphalts, such as gilsonite, glance pitch, and some types of grahamite to improve the plastering properties of the fluid.

4. At the trial plaintiff's counsel conceded that for the purpose of this case the subject matter of the claims at bar is disclosed in the Miller patents, Nos. 2,316,967, application filed June 24, 1941; 2,316,968, application filed August 22, 1941; and 2,356,776, application filed June 16, 1942.

5. Prior to the dates of the applications resulting in the Miller patents, plaintiff and the patentee Miller were employed in the laboratory of Baroid Sales Division of National Lead Company of Los Angeles, California, to which the application in suit has been assigned by plaintiff. Plaintiff Larsen was at that time employed as Manager of Research and Development and Miller as chemist assigned to conduct tests under the direct supervision of Larsen. Both Larsen and Miller were under the supervision of George L. Ratcliffe, Manager of Baroid Sales Division of National Lead Company.

6. On February 19, 1941, Plaintiff Larsen made a written description of the subject-matter of the claims in suit, disclosing the same to Ratcliffe during February, 1941, and also to the patentee Miller during March, 1941.

7. During February, 1941, Plaintiff ordered and received samples of gilsonite, manjak, glance pitch and grahamite. Thereafter, during March, 1941, Plaintiff directed said patentee Miller to conduct laboratory tests of oil base drilling fluids containing various proportions of gilsonite, manjak, glance pitch and grahamite, in comparison with oil base drilling fluids containing Trinidad Lake asphalt and steam refined asphalt in order to determine the filtration losses, viscosity, and gel strength and at various temperatures from room temperatures to 260° F.

8. Thereafter said Miller proceeded with such tests under Larsen's direction and under Larsen's observation and completed the same and reported the same to Larsen in writing on March 17, 1941, and said written report of said Laboratory test was submitted to Ratcliffe who was at that time skilled in the art of oil base drilling fluids. Said laboratory tests were conducted in accordance with the Recommended Practice on Standard Field Procedure for Testing Drilling Fluids theretofore established by the American Petroleum Institute, and such tests demonstrated that oil base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically zero filtration losses at low viscosities and gel strength and were superior to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt.

9. At the time of said demonstration in March, 1941, the practice of testing drilling fluids in accordance with Recommended Practice on Standard field procedure for Testing Drilling Fluids of the American Petroleum Institute, was the standard practice in the drilling fluid art. Such standard procedure was at that time conducted by drillers outside of the well by the apparatus recommended by the American petroleum Institute even during the course of drilling a well, because it was impossible to conduct those tests at the bottom of the well or along the well bore. At that time drillers relied upon such tests conducted by laboratory apparatus outside of the well in order to determine the utility and functioning of a drilling fluid.

10. Plaintiff Larsen conceived the invention of the claims at bar before the filing dates of the applications resulting in the Miller patents.

11. Plaintiff Larsen's testimony as to conception of the invention prior to Miller's filing date was corroborated by Ratcliffe and by documents having dates prior to Miller's filing dates.

12. Plaintiff Larsen did not carry out any demonstration of the invention by actual use of oil base drilling fluids, containing gilsonite, manjak, glance pitch or grahamite in a well.

13. The laboratory tests carried out by the patentee Miller under Plaintiff Larsen's directions were not sufficient to establish a reduction to practice under law and those laboratory tests were not corroborated by Ratcliffe who did not witness the tests. Miller's written report dated March 17, 1941, was submitted to and considered by Ratcliffe.

14. There was no sufficient corroboration of the laboratory tests to constitute a reduction to practice by the plaintiff Larsen even though the laboratory experiments, if properly proven, might be sufficient to constitute a reduction to practice under the law.

15. From March, 1941, when the laboratory tests were completed, to April 17, 1944, when the Larsen application in suit was filed, the United States was in a state of preparation for defense and later at war and Baroid Sales Division of National Lead Company was employing all of its resources to supply materials then being used in the drilling of wells. In order to be commercially feasible, the supply of gilsonite, manjak, glance pitch or grahamite had to be produced at a cost comparable with air blown asphalt then being supplied by the oil companies as a by-product. In order to accomplish that it would have been necessary to obtain mining properties and equipment in order to mine, crush, mill and sack the material. During that period equipment was not available, and even if obtainable the total cost of mine properties and equipment could only have been secured at a cost of over One Hundred Thousand Dollars. Larsen disclosed his conception of the invention to Ratcliffe and Miller; Miller later left the company and filed applications of the Miller patents

in his own name. Miller's report dated March 17, 1941, of the laboratory tests were submitted to Ratcliffe, but at no time prior to the filing dates of the Miller applications did Larsen tell any one that the results of the laboratory tests convinced him that he had discovered a successful well drilling fluid of the character specified in the claims at bar.

16. The fact that plaintiff Larsen waited for three years before filing his application weakens the effect of his testimony in establishing reduction to practice of the subject-matter of the claims in suit.

17. Plaintiff has not established any reduction to practice of the subject-matter of the claims in suit before the effective date of the Miller patents.

18. The claims at bar are not patentable to the plaintiff over the Miller patents.

CONCLUSIONS OF LAW.

1. The plaintiff may overcome the Miller patents by showing a conception and a completion of the invention before the filing dates of the applications resulting in the respective patents.

2. An invention is not completed until it has been both conceived and reduced to practice.

3. Plaintiff is not entitled to a patent containing any of claims 1 to 7, inclusive, set forth in the complaint.

4. The complaint should be dismissed as to all of the claims at bar.

Bailey, J.,
Judge.

JUDGMENT.

Filed December 20, 1950.

This action came on to be heard at this term and thereupon upon consideration thereof, it is this 20th day of December, 1950,

Adjudged that the complaint be and it is hereby dismissed, with costs against the plaintiff.

Bailey, J.,
Judge.

PLAINTIFF'S MOTION FOR A NEW TRIAL.

Filed December 24, 1950.

Plaintiff hereby presents this Motion for a New Trial and prays that this Court open the Judgment, make new Conclusions of Law and direct the entry of a Judgment in favor of Plaintiff.

We do not ask this Court to amend its Findings of Fact or make new Findings of Fact, because the **Findings of Fact** heretofore entered by this Court in the opinion of Plaintiff's attorney **warrant a Judgment** in favor of Plaintiff. It will not even be necessary to refer to the testimony, but only to those Findings. This is really a case involving errors of law apparent from the Record in this case so that no new testimony will be necessary.

This Motion for a New Trial is only directed to Claims 1-4 of which Claim 1 quoted in this Court's Memorandum Opinion and in the Findings of Fact, is typical, reading as follows:

> "Claim 1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilson-

> ite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss."

This Motion is not directed to Claims 5-7, of which Claim 5 also quoted in this Court's Memorandum Opinion and in the Findings of Fact, is typical, reading as follows:

> "Claim 5. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite in an amount sufficient to substantially reduce the filtration loss."

First, it will be noted that claims such as Claim 1 are directed to a composition under R. S. 4886, 35 U. S. C. 31, while claims 5-7 are directed to an art or process under that statute. Now the law has made a distinction as to what is necessary to complete an invention; that is what is necessary to constitute a reduction to practice after conception. That was made clear by the then Chief Justice Taft in Corona Co. v. Dovan Co., 276 U. S. 358, 383, as follows:

> ". . . A process is reduced to practice when it is successfully performed.
>
> "A machine is reduced to practice when it is assembled, adjusted and used.
>
> "A manufacture is reduced to practice when it is completely manufactured.
>
> "A composition of matter is reduced to practice when it is completely composed."
>
> "It is a mistake to assume that reduction to use must necessary be a commercial use," p. 384.

From the above it is clear that in order to constitute a reduction to practice of a **process**, it is necessary that it be **successfully performed**; but when it comes to a **composi-**

tion, it is only necessary that it be **completely composed.** The latter is again illustrated by the Corona-Dovan Case involving vulcanized rubber containing a particular vulcanizing agent. The following tests were approved by the Supreme Court in constituting a reduction to practice of that vulcanized rubber:

> ". . . The fact of a successful 'cure' for practical purposes is established by a simple and short method called the thumb and tooth test. By this test, rubber chemists settle the fact and determine by the resulting product the satisfactory quality of the stock or the mix for vulcanization and they become experts at it," p. 367.
>
> "Kratz's method of testing his rubber slabs is criticized. As already said, it is the method known as the thumb and tooth test. This is not so exact a method in determining all the qualities that a test machine would show in the product, but it is, as already said, one very generally used for practical purposes in factories in determining that the vulcanization or cure is complete," p. 384.

Assuming that as a process forming the subject-matter of claims 5-7, patentee Miller's laboratory tests under Larsen's directions and reported on March 17, 1941, Pl. Ex. 13, did not constitute a reduction to practice of the process claims; we submit that it did constitute a reduction to practice of the composition forming the subject-matter of claims 1-4; for Larsen's drilling fluid was **completely composed.** The test to which the drilling fluids were subjected are closely **analogous** to those approved by the Supreme Court in the Corona-Dovan Case, because that was a Standard Test for drilling fluids, constituting the Recommended Practice of the American Petroleum Institute, Pl. Ex. 2. In fact, that test was **the only one** which could be relied upon even during the drilling of a well, where the tests had to be performed above ground and could not be performed below ground and were actually relied upon by those skilled in the art to establish the functioning of the drilling fluid.

Second. This case is controlled by Patent Office **Rule 75,** as distinguished from an interference proceeding controlled by Patent Office Rules 93 and 94. It is true that Patent Office Rule 75 specifies:

> ". . . facts showing a completion of the invention in this country before the filing date of the application on which the domestic patent issued."

Patent Office Rule 75 simply requires that

> ". . . **the applicant** shall make oath to facts showing a completion of the invention in this country before the filing of the application on which the domestic patent issued."

Patent Office Rule 75 **does not require any corroboration** by another witness; indeed, that is the distinction between the requirement of Patent Office Rule 75 and an interference proceeding. The purpose of Rule 75 simply is to require an applicant "to make **a prima facie** showing of priority in order to overcome the references mentioned in the Rule." In re Grieve, 45 App. D. C. 524, 1917 C. D. 122, 127, and Ex Parte Leins, 33 USPQ 447.

The affidavit furnished by Larsen in the Patent Office and found in Pl. Ex. 1 fully satisfied the Rule and it was not necessary for Larsen to go further and file an affidavit of Ratcliffe, which he did, so in this Court the testimony of Larsen supplemented by documentary proof of his conception on February 19, 1941, Pl. Ex. 10, and of the report of the laboratory tests of March 17, 1941, Pl. Ex. 13, was sufficient to satisfy Patent Office Rule 75. The fact that Larsen went further and produced Ratcliffe, who also identified those documentary exhibits as disclosed to him on the dates thereof, was simply additional evidence which under Patent Office Rule 75 was not even necessary.

Third. This is **not an ordinary case** of priority between independent inventors, but involves a case of originality. Larsen's affidavit in the Patent Office and made more specific by his testimony before this Court, showed that patentee Miller was employed by the same company as was Larsen and worked in the company's laboratory under Larsen's supervision as a fellow employee. Larsen **disclosed the invention to Miller** and directed him to proceed with the laboratory tests, which he did and reported to Larsen. All of that was before Miller's earliest filing date of June 24, 1941. The fact that thereafter Miller without the knowledge and consent of Larsen, as Larsen testified, included Larsen's agents in his applications, can not affect Larsen's rights. Miller's application draft, Pl. Ex. 6, p. 10, as submitted to Larsen, disclosed only the employment of blown asphalt or mineral rubber, which latter is simply another name for blown asphalt, Pl. Ex. 7. It was thereafter that Miller included Larsen's agents gilsonite, manjak, glance pitch and grahamite in his application, but only to improve the **plastering** properties of the oil-base drilling fluid, since in all of the Miller applications air-blown asphalt or mineral rubber is employed to reduce the **filtration** losses.

This case involving as it does originality, comes directly under the decision of the Court of Appeals for this Circuit in Browning v. Johnson, 50 App. D. C. 394, 1921 C. D. 203, 205, as well as the decision of the Court of Customs and Patent Appeals in Riney v. Thomas, 25 USPQ 418, 420 and 421, 77 F. 2d 525. As pointed out by the Courts in those cases where a question of **originality** is involved, the **dates are of little importance**, and naturally so, because **an interloper** can certainly not prevent the first inventor from securing his rights; accordingly, the Patent Office can not rely upon an interloper as a statutory bar.

Fourth. We realize that there has been three years delay in filing of Larsen's application after the laboratory tests. However, that was between March 17, 1941, and April 17, 1944, when this country was in the throes of preparation for War and later the actual War itself. Larsen testified and it is a well known fact that during that period equipment was difficult to obtain; further, that in order to compete with air-blown asphalt produced as a by-product by oil companies, it would have been necessary for Larsen and his assignee to acquire mines, mining equipment, crushing equipment, pulverizing equipment and sacking equipment at a cost exceeding $100,000.00. During that period it could not be expected that Larsen's assignee would divert its efforts in supplying the drillers with much needed material; that, of course, all relates to **commercialization** and not to delay in filing an application.

It is, however, well settled that mere delay in filing an application does not deprive an inventor of his rights nor establish an inference that what he did was in the completion of an invention, here a composition.

In **Browning v. Johnson**, 50 App. D. C. 394, 1921 C. D. 203, supra, Browning did not reduce his invention to practice until **10 years** after his conception and after he disclosed his invention to Johnson, and Browning filed **2 years** after Johnson filed. In fact the Court observed:

> "It will be observed that we are here dealing with long periods of time," p. 204.

After giving the above dates, the Court said, p. 205:

> "But these dates are of little importance, since the case turns upon the single question of originality. Was Johnson an original inventor, or did he derive the invention from Browning?"

In this case **no reduction to practice** or even tests was **necessary** by Larsen at all as against the Miller patents, on which the Patent Office relies. However, there is no dispute but what the laboratory tests were bona fide. In fact, they are included in Larsen's application, PX 1, and have never been questioned by the Patent Office.

In **Seeberger v. Russell**, 26 App. D. C. 344, 1906 C. D. 612, there was a delay of **two and one-half years** in filing the application. The Court of Appeals, however, in reversing the Patent Office, says:

> ". . . There was some delay in applying for a patent it is true, but this is also insufficient to destroy the weight of the proof of actual reduction to practice. No change was made—certainly no material one—in the device of the original construction, . . ."

Fifth. There is and **can be no interference** between Larsen's application and the Miller patents; indeed, the Commissioner's counsel so conceded at the trial. Miller does not claim Larsen's agents and simply refers to them in a passing way to improve the **plastering** properties of an oil base drilling fluid while he relies upon air-blown asphalt to reduce the **filtration** losses.

We respectfully submit that Plaintiff is entitled to the composition claims 1-4 and that this Court should so adjudge.

Bruninga & Sutherland,
By John H. Bruninga,
Attorneys for Plaintiff.

St. Louis, Missouri,
December 23, 1950.

ORDER OVERRULING MOTION FOR A NEW TRIAL.

Filed January 25, 1951.

The motion for a new trial will be overruled.

Bailey, J.,
Judge.

NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

Filed March 23, 1951.

Notice is hereby given that Delmar H. Larsen, plaintiff above-named, hereby appeals to the United States Court of Appeals for the District of Columbia Circuit from the final judgment entered in this action on December 20, 1950, and from the order of the Court denying plaintiff's motion for a new trial entered in this action on January 25, 1951.

John H. Bruninga,
Attorney for Appellant Larsen,
1004 Market Street,
St. Louis 1, Missouri.

PRAECIPE.

Filed March 23, 1951.

Will you please incorporate in the transcript of record on appeal to the United States Court of Appeals for the District of Columbia Circuit, in the above-entitled case, the following:

(1) Complaint.

(2) Answer.

(3) Memorandum Opinion of the District Court.

(4) Findings of Fact and Conclusions of Law.

(5) Judgment.

(6) Plaintiff's motion for a new trial.

(7) Order over-ruling Motion for New Trial.

(8) Notice of Appeal.

(9) All docket entries.

(10) This Praecipe.

(11) The reporter's transcript of evidence.

(12) The following documentary exhibits:

(a) Plaintiff's Exhibits 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 19.

(b) Defendant's Exhibits A, B, C, D, E, and F.

John H. Bruninga,
Attorney for Appellant Larsen.

DOCKET ENTRIES.

Complaint, Filed November 19, 1946.

Answer, Filed January 10, 1949.

Memorandum Opinion, Filed November 9, 1950.

Findings of Fact, Filed December 20, 1950.

Judgment, Filed December 20, 1950.

Plaintiff's Motion for New Trial, Filed December 24, 1950.

Order Overruling Motion, Filed January 25, 1951.

Notice of Appeal, Filed March 23, 1951.

Praecipe, Filed March 23, 1951.

REPORTER'S TRANSCRIPT.

1 Washington, D. C.,
October 23, 1950.

The above-entitled action came on for trial on the merits before the Hon. Jennings Bailey, United States District Judge, at 11:30 o'clock a. m.

Appearances:

On behalf of the Plaintiff:
John H. Bruninga, Esq.

On behalf of the Defendant:
H. H. Miller, Esq.

* * * * * * *

4 Proceedings.

The Deputy Clerk: Larsen v. Marzall.
Mr. Bruninga: The plaintiff is ready.
Mr. Miller: Defendant is ready.
The Court: Is this a 4915 case?
Mr. Miller: Yes, Your Honor.

* * * * * * *

Mr. John H. Bruninga made the opening statement in behalf of the plaintiff, including the status of the art, as follows:

The application in suit, I want to hand up and have marked Plaintiff's Exhibit No. 1.

5 The Court: Received.

(File wrapper of patent application Serial No. 531,494 was marked Plaintiff's Exhibit No. 1 and received in evidence.)

* * * * * * *

The subject matter relates to the employment of drilling fluids as used in oil wells.

* * * * * * *

A drill pipe, which has a large bit at its lower end, is rotated so as to bore down into the earth.

* * * * * * *

It is a hollow pipe, of course, and in order to get the cuttings to the surface, instead of using like an ordinary post hole digger, raising it up, what they do is to pump through that pipe a fluid which comes out at the bottom and carries the cuttings with it to the surface. These cuttings pass through a settling ditch or over a screen to take out—that is, the fluid passes over—to take out the
cuttings and the fluid then goes to a pump where it
6 is picked up again by pumps and recirculated.

Now, the fluids that have been used, until about 1940 or 1941, were of the aqueous drilling fluids, that is, the external phase was water which had in it clay to give viscosity and thickness in order to more readily carry the cuttings to the surface, because if you had just water, then you would have to have a tremendous upward velocity which would tear down the bore hole. This drilling fluid also performed the function of walling the bore hole by the water filtrating into the formation and leaving clay behind it.

Now, in around 1940, the non-aqueous type or oil base drilling fluid came along. It had been known for quite a long time because there was a Swann patent owned by the plaintiff in this case which had isued in 1923 and, by the way, Mr. Larsen assigned this application to the National Lead Company after, however, the suit was filed. It was not recorded until that time.

Now, in an oil base fluid, you have oil instead of water as the fluid phase as, what you might say, the external phase. But again, you have to put it through something

to impart viscosity to it in order to carry those cuttings up. Again, you have to have something which will build a wall on the bore hole and seal it, you might say, seal the bore hole, otherwise the oil would simply flow right out into the formation and the interesting thing that
7 would happen, which has happened in a number of
cases where they use kerosene, is that the kerosene will go right down into the neighboring well and they will pump it out and use it. So, they have to have something to prevent infiltration of the oil and kerosene into the formation which would become lost, and they have to have something to give viscosity, and they have to have something which gives enough, what they call "gel," which we could use interchangeably in this case with viscosity, in order to support those cuttings as they rise to the surface.

Now, in the Swann patent which, by the way, was owned by the plaintiff before this ever happened—and interestingly, it was before Your Honor as a prior art reference many years ago, but you have probably forgotten.

The Court: Yes.

Mr. Bruninga: In that case, he used an oil, he used a number of things, rosin and sulphur and particularly asphalt. Asphalt, of course, will dissolve in oil and form a rather thick fluid. But this thing did not really come into commercial vogue until 1940.

Now, the next advance in the art was the work by the Shell Company. Of course, we did not know anything about that, if they had any patent pending for it.

In the petroleum industry, they have as a by-product, airblown asphalt. Well, they airblow that asphalt
8 and get what they call an airblown asphalt, which
is known as such, but it is also known as "mineral rubber," and I want this Court to remember that: The term mineral rubber is applied to airblown asphalt. The Shell Company calls it airblown asphalt, the Union Oil

Company calls it mineral rubber, it is sold under those two names.

Now, they have that as a by-product and can use it very cheaply and they use that in a drilling fluid instead of the ordinary asphalt, or whatever asphalt it was in the Swann patent, which was not given. They obtained a patent for the use of that airblown asphalt about the latter part of 1940 which we did not know anything about; whether Mr. Miller knew about it or not, I cannot say to this Court.

Now, in order to give the viscosity effect to that drilling fluid or the gel effect, in order to enable the cuttings to be raised to the surface, they used a number of things, lamp black, Shell used magnesium oxide and Miller in this case thought of a calcium oxide. He was employed by Shell and Shell laid claim to that. Calcium oxide and magnesium oxide are fully equivalent.

* * * * * * *

Mr. H. H. Miller made the opening statement in behalf of defendant. Mr. Miller also handed to the Court Defendant's Exhibit 1, containing Exhibits A, B, C, D, E and F.

* * * * * * *

19 DELMAR H. LARSEN,

the plaintiff, called as a witness in his own behalf, having been first duly sworn, was examined and testified as follows:

Direct Examination,

By Mr. Bruninga:

Q. Give your name, age, and residence. A. My name is Delmar H. Larsen; I am 39 years old, and I live in Los Angeles, California.

20 Q. Are you the applicant of the application in this suit? A. Yes, I am.

Q. Give briefly your education. A. I graduated as a chemist from the California Institute of Technology in Pasadena with a Bachelor's degree, and then I took some graduate work also in chemistry at that same institution and received a Master's degree.

Q. What did you do after that? A. Shortly after receiving a Master's degree, I entered the employment of the Baroid Sales Division of National Lead Company as a research chemist. I have been with them ever since, for the most part as director of research.

Q. What year did you enter the Baroid Sales Company? A. In 1936.

Q. And what was your job, then, in 1940? A. I was director of research for the Baroid Sales Division.

Q. And you have assigned this application to the National Lead Company? A. Yes, I have.

Mr. Bruninga: Does the record show that, Counsel, in the file?

Mr. Miller: Yes, the assignment is on file.

21 By Mr. Bruninga: Q. Now, what was the business of National Lead Company from 1940, say, to 1944? A. The business of Baroid Sales?

Q. You can start in 1936, it hasn't changed much. A. The business of the Baroid Sales Division of the National Lead Company has been that of supplying materials to people who drill oil wells, those materials being necessary for use in drilling wells, particularly in connection with the muds used therein.

Q. Now, would you tell the Court very briefly about how oil wells are drilled—unless counsel will take my statement as given in the opening statement?

Mr. Miller: I am willing to concede the way counsel explained the drilling of wells is sufficient so the witness would not have to testify to it.

The Court: Very well.

Mr. Bruninga: We have had a number of these cases.

By Mr. Bruninga: Q. Now, as I said in my statement, there are two kinds of drilling fluids, one is water and the other is an oil base drilling fluid. Now, let us go to the oil base drilling fluid——

The Court: I am not familiar with the law in this respect. I must say it is difficult for me to understand
22 how this Court could determine priority of invention between the applicant and Miller without Miller being before the Court.

Mr. Bruninga: No, he does not have to be before the Court.

The Court: Well, that may be all right, but it seems to me it is contrary to general principles of law.

Mr. Bruninga: I will tell you, I had a case before Judge Morris just like that. That was Wayne v. Marzall, 30 F. Supp. 161, where there is a question of whether we were prior to or later than a DeGroote patent. But we did not claim the subject matter of the DeGroote patent and DeGroote did not claim the subject matter of our patent, so there is no interference. Here is the distinction, Your Honor, if there is no interference between the claims of the patents, then Rule 75 applies. The interference rules only apply where there is an interference between claims. Now, that is what I am going to come down to, to show that these Miller patents are drawn in such a way that we could not copy those claims.

Mr. Miller: I will concede you could not make the claims.

Mr. Bruninga: And you concede there could not be any interference?

Mr. Miller: I concede there could not be any interference.

23 Mr. Bruninga: And Rule 75 applies?

Mr. Miller: It is wholly a question of Rule 75.

Mr. Bruninga: So, therefore, Your Honor, Miller is no party to this suit at all.

Can I proceed?

The Court: Yes, proceed.

By Mr. Bruninga: Q. Mr. Larsen, where these oil base drilling fluids are used, what is the external phase or the fluid phase, you might say? A. The fluid phase of the mud, Your Honor, is oil which may be crude oil, or may be a semi-refined portion of crude oil like fuel oil or Diesel oil. It may even be something on the order of kerosene.

Q. Now, when you use an oil like that alone, you can of course pump that down the drill pipe and it comes up the outside. Is it used alone like that? A. No, it is used alone only in very rare cases, because most generally the oil used in that fashion would permeate into porous formations and the oil would be lost.

Q. Have you ever heard of any trouble in that connection? A. Yes, in the Montobello field in California quite often in the past when oil was used in that manner it would reappear in other people's wells farther down the structure.

24 Q. How does it get over there? A. Being more or less pure liquid, it simply seeps through the sandstone of the porous formations.

Q. What do you want to do with it in that case, to prevent that? A. The idea is much the same as with ordinary clay water muds, we want to add something to the oil which will make it impossible for the oil to ooze through the sandstone, that is, to filter into the sandstone.

Q. Well, does it filter much? A. Even if it filters a little, the solids in the muds will build up as a filter and cake on the walls of the bore holes and restrict the diameter, so that for best results the muds should not filter at all.

Q. Now, what can you use to give you that characteristic to an oil base drilling fluid or mud, it is called also mud, isn't it? A. That is right, it is called mud by analogy with the clay-water muds that have been used before. In order to impart that infilterability, there are several diverse things that can be used. Soaps, the top of soaps that are used in making ordinary lubricating grease will have that effect; lamp black will have that effect;

blown asphalt will, and finally coming to the present in-
vention, gilsonite, which is a peculiar sort of an
25 asphaltic material which occurs in Utah, and a
couple of other materials related to gilsonite,
namely, grahamite and manjak, have the same effect as gilsonite.

Q. Now, these asphalts, call them asphalts that you have described for that purpose, what is the effect, what do they do in the well to prevent infiltration? A. These materials are of such colloidal size that they will not penetrate the exceedingly fine pores of most sandstone. They stay on the outside and virtually plug up the outside of the sandstone so that further oil cannot seep through.

Q. Now, let us come down to the drilling fluid—another characteristic it has, it carries those cuttings up to the surface, doesn't it? A. That is true.

Q. Now, is the asphalt sufficient for that? A. You refer to the natural asphalts of this application?

Q. Well, let's refer to airblown asphalt first. A. Airblown asphalt in general does not provide enough gel-like property to these oil base muds that the mud will support the cuttings and bring them to the surface. In fact, most of the time an airblown asphalt will provide too much of this gel-like property, if enough is used to give complete infilterability to the mud.

26 Q. Well, is anything used outside of the asphalt in
those cases to give you viscosity or gel strength to
carry the cuttings up? A. Yes, there are several things which will do little more than simply impart gel strength to the muds. Magnesium oxide, magnesium hydroxide, calcium hydroxide, and other materials will do that.

Q. You have a bunch of them specified in your applications? A. Yes, there are several named in the specifications.

Q. Will you just look at that specification Plaintiffs Exhibit 1 and show which are good for that purpose;

will you give the page to the Court? A. Reading from page 3 of the Specification, beginning at line 7:

> "Examples of the latter are calcium and magnesium hydroxide and oxide, lamp black, blown asphalt, alkali metal and heavy metal salts of organic acids of relatively high molecular weight as oleates, stearates, xanthates, and the like, and similar materials."

Q. Now, where you use the airblown asphalt, I believe you said that if you use enough to secure zero penetration or infiltration, your viscosity would go up too
27 much, is that right? A. That is in general the case.

Q. Now, where you use your gilsonite, manjak and grahamite, what is the situation there? A. There the fact that the gilsonite and these other two materials will do nothing more or less than cut the filtration to zero, allows greater control because the filtration can be reduced to zero without particularly thickening the mud and then the mud can be thickened up separately by addition of some of these other agents that have that specific property.

Q. In other words, you can use two agents independently and you can get at the filtration rate of zero and add a proper viscosity, is that right? A. That is right, you have two variables you want to control and by means of the invention concerned here, you have two different substances to effect changes in these two variables.

Q. And now, Mr. Larsen, in the case of your particular agents, can they be used in connection with various oils? A. Yes, they can be used with the usual oils that are used in oil base muds.

Q. And have you tested them, found out what they will do as far as reducing the filtration rate? A. Yes. Generally speaking, they reduce filtration rates to zero
28 for a one-hour test which is as long as anyone ever makes a test.

Q. Now, I want to ask you right now, how is filtration rate determined? A. Filtration rate is almost universally determined by taking a small amount of mud and applying pressure to it in a pressure filter device so that the mud is filtered off against filter paper. The ideal is to get a mud which even at 100 pounds per square inch pressure will not give any appreciable amount of filtrate even though the test is prolonged for as long as a half an hour or an hour.

* * * * * * *

29 Q. Now, Mr. Larsen, you testified just before lunch about the filtration rate and how it is determined. Has that been a practice in the industry for the drilling of wells? A. Yes, it has been the practice to make routine tests of the filtration loss of drilling muds for about fifteen years in the oil well drilling industry.

Q. Have you been a member of any committee in the A. P. I., American Petroleum Institute? A. I have attended many meetings of the American Petroleum Institute subcommittee on field testing of drilling fluids throughout the years as a member of the Institute, but not directly as a member of the subcommittee.

Q. Now, I am going to hand you a booklet which I will mark Plaintiff's Exhibit No. 2.

* * * * * * *

30 Mr. Bruninga: I have handed a copy to counsel and I want to refer particularly to the various tests in them. I think you know them pretty well by heart, and also particular apparatus on page 8, which I want to hand to the Court. I offer that in evidence if there is no objection.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

By Mr. Bruninga: Q. Can you briefly describe that apparatus there? A. The apparatus shown on that page of that exhibit is a testing apparatus for performing the filtration tests which we discussed before the noon recess. The apparatus and the method of testing mud for this filtration has been standardized by the American Petroleum Institute, and that particular exhibit is the standard code of field testing procedure for drilling muds as laid down by the Institute.

Q. And there are different parts there indicated on page 8, namely, cylinder, a filter paper, and a screen and a bottom cap and a pressure inlet, and that is in figure 6 and in Figure 7 the whole thing as assembled.
31 Now, what is done, what is poured into that cylinder? A. Mud is poured into the cylinder which is essentially open on the bottom except for the filter paper.

Q. That is the drilling fluid that you want to test? A. That is correct. Then compressed air at 100 pounds per square inch pressure is admitted to the top of the cylinder, which would tend to squeeze any fluid in the cylinder out through the filter paper. An ordinary fluid such as oil or water will come right through the filter paper and filter through in a short time, perhaps a matter of seconds. A good drilling mud will fail to filter. The collodial material in the drilling mud will be held back by the filter paper and that will stop further motion of fluid. So that the degree of merit of a drilling mud when tested by this procedure is directly tied in with the absence of any filtrate exuding from the bottom of the cylinder. A graduated glass measure is placed below the cylinder to catch whatever filtrate may come through.

Mr. Bruninga: And now I filed with the Patent Office, Your Honor, the 1938 edition, and with the Board of Appeals, and it is just about the same, as counsel sees, as the 1942.

By Mr. Bruninga: Q. It has been a standard practice then since 1938, hasn't it? A. That is right.

32 Q. And it was in 1941, was it not? A. It was.

Q. Now, is that actually used at the wells? A. It is used almost universally in drilling at the present time as a routine check on drilling wells.

Q. Well, now, in the drilling of a well as I have described, the drilling fluid comes, whether oil base or water base, comes out into it, and are tests taken of that drilling fluid? A. That is right, tests are made of the drilling mud as soon as it comes out of the well, it has been circulated through the well and the test is performed at the surface on a small sample which gives a direct indication of whether the mud is in good condition or not.

Q. In 1940 and 1941, was the drilling of a well and particularly the use of drilling fluids a hit or miss proposition, or did they have scientific men that worked, went around the wells? A. At that time and also continuing to the present, it was the practice to have specially trained engineers called mud engineers in direct charge of the mud of the well. These mud engineers were usually petroleum engineers or chemical engineers.

Q. Do you know who Preston E. Chaney is of Sun
33 Oil Company? A. Yes, he was a petroleum engineer and in particular, I believe, a mud engineer
for the Sun Oil Company.

Q. Does he have a good reputation? A. Yes, he has a good reputation.

Mr. Bruninga: Here is page 25 entitled "Review of recent advances in drilling mud control," in the November 23, 1942, issue of "Oil Weekly," which I will mark and offer in evidence as Plaintiff's Exhibit No. 3.

Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. Now, on the right-hand column near the bottom, he refers to A. P. I. Code 29, recommended practice on standard field procedure for the testing of drilling fluids. Is that the one that I just handed to the Court? A. Yes, it is. This is the second edition which

Mr. Chaney refers to, which essentially is the same as the third edition which was entered as an exhibit.

Q. Now, he says in there, after calling attention to field mud engineers, the second paragraph on the left, he says:

> "In this paper, an attempt is made to bridge this gap between laboratory and field practice."

34 He further says:

> "All methods of mud treatment suggested on the following pages have been used successfully and economically in the field."

And he refers particularly to a thirty-minute filter test record in milliliters of filtrate at the end of thirty minutes record and of cake thickness in thirty-seconds of an inch.

He says this, "Daily Tests on Drilling Mud:

> "The following tests are essential to any proper estimate of mud condition: They should be conducted daily or more often in case of trouble. A suitable form, or a place on the daily report, should be provided for reporting the results of those daily tests."

Now, what is your understanding of what the practice was in 1940 and 1941 in that respect? A. This is an accurate statement, I believe, of the prevailing field practice.

Q. Now, Mr. Larsen, in determining the filtration rate at a well, is it possible to do it any other way than on top of the ground? A. No, it is not possible to get down into the well while the well is being drilled. The well is perhaps six or eight or ten inches in diameter and the significant filtration is taking place at great depths and
at a great temperatures. No one has ever even de-
35 vised an apparatus that could be perhaps lowered
into a well with filtration tests being made down there. The practice is universal of testing mud at the surface.

Q. By this standard procedure as in Plaintiff's Exhibit No. 2, is that right? A. That is correct.

Q. Now, going back farther now, this test, did you make any tests on your drilling fluids containing this gilsonite, manjak, and grahamite? A. Yes, we made up the mud in accordance with the specifications and these various muds were tested not only for filtration rate in accordance with the standard American Petroleum Institute methods, but we determined the viscosity and gelation characteristics of these muds.

Q. When was that done, what month, what year? A. That was done in March and April of 1941.

Q. You have the report, don't you? A. I have a report.

Q. You can check up from that right now what month that was done? A. The report covering the work which we did on these muds was dated March 17, 1941, so that the work was done earlier in March that year and I judge also in February.

Q. Well, the report has sheets 1 and 2 on it, which
were later on given to the Patent Office. You are
36 familiar with the Patent Office record, are you? A.
Yes, I am.

Q. And the Court has them there, you will find the tests over here that we refer to later on anyway. And are those the results of those tests, the figures? A. Yes, those are the actual experimental findings of the tests that we made.

Q. Who made that test? A. George Miller made the test.

Q. The man who took out the patents we are talking about? A. That is right.

Q. And by whom was he then employed? A. He was employed by the Baroid Sales Division of National Lead Company.

Q. In what capacity? A. As a laboratory chemist.

Q. Now, did George Miller have any idea on the oil base drilling fluid before that time? A. Yes, he came to us with the idea of using quicklime as an agent to add to an oil base drilling fluid contaminated with water. It turns out, Your Honor, that in working with oil base

drilling fluids, if they get too much water in them, the water wets the solid particles in the mud like sand and
weighty material and they agglomerate and settle
37 out. So, it is necessary to get rid of the water. That
is rather difficult to do because these oil base muds tend to be thick in the first place, and George Miller had found out that if quicklime were added to such a water contaminated mud, the quicklime would slake with the water in the mud, thereby removing it. The quicklime would change to hydrated lime and the water would be removed. It is essentially a chemical treating agent. He subsequently took out a patent which covered that process.

Q. And he came to you in 1940? A. That is right.

Q. Now, do you know who George L. Ratcliffe is? A. Yes, I do.

Q. Did you know him in 1940? A. Yes.

Q. What position did he occupy? A. He was then and still is the general manager of the Baroid Sales Division of the National Lead Company, the firm which employed both George Miller and myself at that time.

Q. Did you have anything to do with George Miller, as far as his invention is concerned, with reference to maybe some contractual relation? A. You refer to Mr. Miller's invention?

Q. Yes, what he said his invention was.

A. Yes, I was the director of research of the Baroid
38 Division at that time and when Mr. Miller came to
us with this idea of his, it was left up to me together with other members of the company to try to judge the merit of his invention and to guide him in drawing up the patent application.

Q. Cutting it short, did you have anything to do with any negotiations, did you know there were negotiations going on? A. Yes, I was aware of them.

Q. And do you know whether any kind of an agreement, by letter or otherwise, was entered into with Mr. Miller? A. There was a letter agreement.

Q. All right. Now, I have handed counsel a copy sometime ago and I hand you a copy of a letter of April 16, 1940, on the letterhead of Baroid Sales Division of National Lead Company, to George Miller.

* * * * * * *

Mr. Bruninga: It has been marked and I offer it in evidence as Plaintiff's Exhibit No. 4. I don't think there will be any objection.

Mr. Miller: No objection.

By Mr. Bruninga: Q. Do you have the original there? A. Yes, that is April 16, 1940.

Q. Yes, April 16, 1940. Do you have the original?
39 A. I have the original counterpart belonging to the Baroid Sales Division. The actual original was given to Mr. Miller, Mr. George Miller, and presumably he still has it.

Q. Well, what I have handed the Court, is that a photostat of it? A. Yes, that is an exact photo copy of the original.

Mr. Bruninga: I take it you have no objection; I offer it in evidence.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

By Mr. Bruninga: Q. Now, it says in there:

> "We will put you on the company payroll at a salary of $250 per month effective April 14, 1940, for a period of six months. During this period, you will perform whatever duty is required of you by the company in the same manner as any other employee."

Then, later on there is a provision that he could test out this so-called invention of his and that he will obtain a royalty on it when he obtains the patent.

Now, was George Miller put on the company payroll?

40 A. Yes, he was in June of 1940.

Q. And under whose direction did he serve, outside of Mr. Ratcliffe's? A. Directly under my direction.

Q. Now, do you know whether George Miller had an application prepared on that thing that he had at that time, the subject that he had at that time? A. Yes, he did.

Q. I want to hand you a letter, for date purposes, which is a carbon copy, which I will mark and offer as Plaintiff's Exhibit No. 5, from D. H. Larsen to J. H. Bruninga, dated January 15, 1941.

Mr. Bruninga: Counsel, it is just for the purpose of fixing the date.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

By Mr. Bruninga: Q. Tell me whether you can identify that letter and, if so, tell the Court you can identify it and what it means, what date it fixes. What does it fix? A. Mr. Bruninga, if His Honor would permit me after he has read it, to take it to refresh my memory——

41 (The exhibit was handed to the witness.)

The Witness: That fixes the date on which the local patent attorneys in Los Angeles that had been chosen to draw up the application on Mr. Miller's invention had completed a first draft of the application.

By Mr. Bruninga: Q. What is the name of the firm? A. Lyon and Lyon.

Q. Now, did you obtain a copy of the application at that time? A. Yes, I did. Lyon and Lyon sent me a copy.

Q. All right.

Mr. Bruninga: I mark here as Plaintiff's Exhibit No. 6 and will offer in evidence, I don't think counsel will have any objection to it, a petition, power of attorney and a specification. You might hand me your copy of that while I hand this to the Court.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

By Mr. Bruninga: Q. First, look at it and tell me whether you recognize it? A. Yes, I recall this.

42 Q. Now, on page 10 of that application is the following formula:

> "Percentage by weight of material: 50 percent stove oil or gas oil, 33 percent calcium carbonate or oyster shell lime, 13 percent blown asphalt or mineral rubber, 3.02 percent water, 0.98 percent calcium oxide, 4 percent by weight of calcium hydroxide."

Now, what did that represent at that time?

A. That represented a formulation for making up oil base muds.

Q. Whose? A. George Miller's formula.

Q. That is what he disclosed to you, is that right? A. Yes.

Q. Well, why did you hesitate, that is what I want to know. A. Well, he came to us, he knew only of one particular blown asphalt that would work, that made by the Shell Oil Company with whom he was employed and after he came with us, we got samples of other blown asphalts.

Q. Now, what was one of them, what was the Shell asphalt known as? A. The Shell asphalt was known as airblown asphalt, Y-20.

43 Q. And what was another blown asphalt known as?

A. Another blown asphalt which we obtained after George Miller came with us, was made by the Union Oil Company of California, and sold by them as mineral rubber.

Q. Now, I hand you a booklet called "Asphaltic Products, Their Manufacture, Properties and Uses," copyrighted in 1935. I am only interested in pages 22 and 23, which I will mark as Plaintiff's Exhibit No. 7, and will also offer in evidence.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

By Mr. Bruninga: Q. How long have you been familiar with that book? A. About five or six years.

Q. It shows it was copyrighted in 1935? A. That is right.

Q. Now, on the bottom of page 22 and ending on page 23, there is a statement under "Rubber." On page 23 it is stated:

> "Recommended asphalt—Union mineral rubber. Large quantities of airblown asphalt known as mineral rubber are consumed annually in compound rubber for tires and the like. Asphalt preserves the
> 44 color of the rubber, and at the same time increases its toughness."

Now, what did mineral rubber mean to you in 1940? A. It meant rather severely blown airblown asphalt.

Q. Well, where did you obtain what was called mineral rubber in 1940? A. From the Union Oil Company of California.

Q. What was it sold to you as? A. Airblown asphalt of the mineral rubber grade.

Q. Was it airblown asphalt? A. Yes, it was airblown asphalt.

Q. Was it gilsonite? A. No, it was not.

Q. Was it manjak? A. No.

Q. Was it grahamite? A. No.

Q. Now, did Miller make any test of his particular drilling fluid contained in that application, Plaintiff's Exhibit No. 6? A. Yes, he did a fair amount of laboratory work in our laboratories on different formulations all along the lines of his idea.

Q. Do you have any photostatic copy of that?

Mr. Bruninga: I have the original here, Your Honor,
45 but I have got the original marked up here. I think we could use a photostatic copy and counsel will not object.

Mr. Miller: No objection.

The Witness: The report—which date did you refer to?

By Mr. Bruninga: Q. January 31, 1941. A. Yes, I have a negative photo copy of that.

Mr. Bruninga: The report of January 31, 1941, we will mark and offer in evidence as Plaintiff's Exhibit No. 8.

Mr. Miller: No objection.

The Court: Received

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By Mr. Bruninga: Q. That is dated, Mr. Larsen, January 31, 1941, as shown on page 9, signed by George Miller and sworn to before Mr. West, a Notary Public. Who is Mr. West? A. Mr. West is an employee of the Baroid Sales Division, who also happens to be the office notary.

Q. Where was that test made? A. That was made in the Los Angeles laboratory of the Baroid Sales Division.

Q. Can you tell me, with reference to the standard procedure of Plaintiff's Exhibit No. 2 whether the test
46 was made in accordance with that procedure?
A. Yes, the filtration tests shown on that report were made exactly along the lines given in the standard procedure and with essentially the same mechanical apparatus.

Q. Now, on page 6, it is stated as follows:

> "Union Oil Company, manufacturers of blown asphalt, which is sold under the trade-mark of mineral rubber"—

That is the statement by George Miller, And on the test sheet 1 is effects of various mineral rubbers, and on sheet No. 2, effects of various blown asphalts.

What were those materials that were tested? A. We decided that we had better get samples of all of the air-blown asphalts available in California, and we contacted several different firms that made blown asphalts. Some of them were of the high melting point grade sold as mineral rubbers, and those were collected into one data sheet; the others that were sold simply as blown asphalts were collected in the other data sheet.

Q. Now, the sheets 1 and 2 also show Ca $(OH)_2$, after it was used. What is that? A. That is Calcium Hydroxide, that is hydrated lime, slake lime.

Q. It is calcium oxide plus water, is that right? A. That is right, the reaction product of that.

47 The Court: Do they use that as a drilling agent?

The Witness: Well, in this particular art, its use goes way back of all of this work here as a suspending agent. It is a peculiar fact that if you mix a hydrated lime with any oil it will give a gel-like structure, sort of a buttery structure, and that enables the mud so treated to suspend cuttings and weighty material.

By Mr. Bruninga: Q. What relation did that report have to Miller's invention, he said he invented when he came to Baroid, was it the same or different? A. It was essentially the same.

Q. Did it have calcium hydroxide instead of calcium oxide? A. That is right, although even in the mud which was George Miller's idea, he deliberately produced some calcium hydroxide as well as the calcium oxide for suspension purposes.

Q. That test was made in the laboratory at Baroid Sales? A. That is right.

Q. Were you there at that time? A. Yes, I was there at the time.

Q. Where was your office with reference to the

48 laboratory? A. My office was just on the other side of the hall from the laboratory, about two doors or about six feet apart, I guess.

Q. Did you watch that test? A. Yes, I was in and out of the laboratory during the day and kept a fairly close check on what was going on.

Q. Well, you were interested to find out whether it was good or bad because Baroid was interested, is that right? A. Yes, that was one of my responsibilities, in fact.

Q. Now, when any letter came to Mr. Ratcliffe, did you see it? A. Yes.

Q. Did you see any replies that he made? A. Yes, in general, I saw most of them.

Q. And when they related to laboratory work, was that true also? A. Yes.

Q. I call your attention to a letter of February 13, 1941, from George Miller, to Mr. George Ratcliffe, which is on the letterhead of Baroid Sales Division, which I will offer in evidence as Plaintiff's Exhibit No. 9. I don't think there will be any objection.

Mr. Miller: No objection.

The Court: Received.

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49 By Mr. Bruninga: Q. Can you identify that letter?
A. I believe I can after His Honor has finished reading it.

(The exhibit was handed to the witness.)

The Witness: Yes, I saw a copy of this letter shortly after it was written.

By Mr. Bruninga: Q. Now, it will be further identified by Mr. Ratcliffe. I hand you a letter dated February 19, 1941, a carbon copy of a letter of the general manager to "Dear Mr. Miller," and the initials "G. L. R." which I will mark and offer in evidence as Plaintiff's Exhibit No. 10. I don't think there will be any objection.

Mr. Miller: No objection.

The Court: Received.

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The Witness: Yes, I remember seeing that, too.

By Mr. Bruninga: Q. Now, coming to the date of
50 January, 1941, Mr. Miller's report on his tests, did
those tests satisfy you that his composition was an ideal composition? A. No, we thought it was probably a workable composition, but not necessarily ideal.

Q. What was the matter with it, what defect? A. Many of these blown asphalts would make the mud too thick if you put in enough to get a very low filtration.

Q. How about this particular composition that is in that report, you have the report, Exhibit No. 8, how did that stand in that direction? A. Exhibit No. 8, was it?

Q. That was the Miller report of January, 1941, with this blown asphalt. A. And what was the question?

Q. Was there anything the matter with that particular asphalt? A. From a practical or from a technical standpoint?

Q. From a practical standpoint, whether that filled the bill. A. Well, it would work but it was not perfect.

Q. Could you get zero filtration with it? A. If I could have the exhibit for just a moment, I will take a look. Some of the blown asphalts tried, gave a zero filtration in 60 minutes by the standard method: although in general
those that did give zero filtration gave a quite substantial
51 gel at room temperature, as shown in the
fourth from the last row of each data sheet.

Q. Well, did you get any information around that time about any Shell patents? A. Yes, about that time the Shell Oil Company had issued to them a patent which had what appeared to be rather broad claims covering the use of blown asphalt and oil base muds. The issuance of that patent changed our thinking on the whole matter.

Q. Well, there was a letter there from Miller to Ratcliffe which mentioned that patent, Plaintiff's Exhibit No. 9, and Mr. Ratcliffe replied that he did not want to infringe that patent That was the Dawson patent, wasn't it? A. That is right.

Q. The Dawson patent, No. 2,223,027. What did you do after that, we are coming now to January, 1941. A. We decided that we would not want to become involved in any controversy with the Shell Oil Company on their patents, and we thought we had better not become involved in anything with the Miller invention.

Q. Now, I hand you photostats of two letters, one of February 19, 1941, from D. H. Larsen to J. H. Bruninga, and a letter of March 5, 1941, J. H. Bruninga to Mr. George L. Ratcliffe, which I will mark as Plaintiff's Exhibits Nos. 11 and 12.

52 Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. What are those? A. The first of these is a letter which I wrote to you, that is, to Mr. Bruninga on February 19, 1941, disclosing an idea which I had which I felt might be the answer to a satisfactory oil base mud, namely, one containing gilsonite or grahamite or manjak, as the ingredient serving to give zero filtration.

The second exhibit is Mr. Bruninga's reply to my superior, Mr. Ratcliffe, dated March 5, 1941, in which Mr. Bruninga acknowledged receipt of my letter and in which he called attention to the Swann patent of some years back.

Q. I will come to that later on. Now, did you proceed to get the materials? A. Yes, in fact, that same day, and then a few days later I wrote to various suppliers of gilsonite, grahamite and manjek, asking for samples.

53 Q. Now, the file of the application shows, by photostats, on February 9, 1941, you wrote to Allied Asphalt & Mineral Corporation for grahamite and manjak, with a reply of February 24, 1941, sending it, and letters of February 25, 1941, you wrote the Utah Gilsonite Company with a reply of February 27, 1941, sending it.

Mr. Bruninga: Your Honor, I believe counsel will agree that those can be used in the file that I am giving the Court.

Mr. Miller: Yes.

By Mr. Bruninga: Q. You received those samples, did you? A. Yes, the samples came in to me marked for my attention.

Q. Now, what did you do after that? A. I took the samples of gilsonite and these other two materials into the laboratory where George Miller was working, and told him to make up some oil base muds using them and perform the usual tests on the muds.

Q. Did Miller perform those tests? A. Yes, he did.

Q. Now, the application in suit again contains Sheets 1 and 2 as a result of those tests, and I think you are familiar with them. Do you have a copy of the complete Report No. 3? A. Yes, I do.

54 Q. Who made that? A. George Miller made the report.

Q. Who conducted the tests? A. George Miller.

Q. What is the date of it? A. March 17, 1941.

Q. Would you hand that report to the Court, because I am going to mark it now Plaintiff's Exhibit No. 13.

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Mr. Bruninga: I offer it in evidence.

Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. Is that a photostat or is that a carbon copy you handed to the Judge of this report No. 3? A. That is an original, signed copy.

Q. Where was that test carried out? A. The test was carried out in the laboratory across the hall from my office in Los Angeles.

Q. Did you watch the test or just get the report? A. No, I watched the test; naturally I was quite interested

55 in how the experimental work would come out.

Q. How did the test turn out? A. Very well indeed, I thought.

Q. Now, comparing your gilsonite, grahamite and manjak with the best one of the blown asphalts, how did they compare? A. The tests made with my materials showed the peculiar property of giving zero filtration without raising the gel of the mud, that is, without particularly thickening the mud.

Q. And how about the next best one of the blown asphalts, what did that do in that respect? A. Would you like me to read directly from the test?

Q. No. A. I don't recall offhand what the filtration loss shown by the report was, but the gelation as shown is rather considerable.

Q. Well, all right, I will hand it to you then. I think it is all shown on Sheet No. 1. A. All of the tests on Sheet No. 1 were of gilsonite. Did you have a question on those?

Q. Well, all right, take gilsonite and then take the other two. A. For example, one of the things that we tried out was asphalt from the famous lake on the Island of Trinidad, that is shown in the first column of Sheet
No. 2. That showed a filtration of 3.6 cubic centi-
56 meters of oil in one hour, which is not very good.
On Sheet No. 3, the report shows the result of tests on a couple of steam refined asphalts. They have very high filter losses of respectively 25 and 75 cubic centimeters, which again is much too high for practical use.

Q. How about the gel strength where you use your three materials? A. The gel strength is shown by pages 1 and 2 of the report to be substantially nil in all cases where the materials of this application are used.

Q. Now, on Sheet No. 1, there is one that contains 20 percent calcium hydroxide in which the filtration rate is 8.8. What is the matter with that; and another one, 82.7, why did that happen? A. That just had too much lime in there, there is a limit to the amount of hydrated lime that can be added.

Q. Now, where you talk about the gel and room temperature on Sheet 1 as poor and poorer, what does that mean, high or low? A. That means low.

Q. Now, where you use the airblown asphalt, the gel strength was pretty good, wasn't it? A. Yes, that is pretty good, if what you want is a high gel.

Q. Now, the concluding paragraph of the whole report of Mr. Miller on that test is that as distinguished from airblown asphalt, they don't give any gel strength and that is why he thought his airblown asphalt was better than your gilsonite, manjak, and the other one. What have you to say about that, what was your opinion? A. Well, it was George Miller's idea that you should get a high gel by the addition of these materials to be added to give low filterability. But I believe that that is somewhat of a misconception, it makes it more difficult to control the mud in the field. 57

Q. I hand you a letter from George L. Ratcliffe to George Miller, dated April 16, 1941, which I will mark as Plaintiff's Exhibit No. 14.

Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. Do you know what that is? A. Yes, I do.

Q. Did you see it around that time? A. Yes.

Q. Well, it reads for itself what it is. What did Miller do after that, did he stay with Baroid Sales? A. Yes, he did. He could not very well go back to the Shell Oil Company. We had him on the payroll, so we decided we would make him a field service engineer. 58

Your Honor, we have a good many engineers in our employ that are out in the oil fields servicing wells in which our products are used, and we sent Mr. Miller to Baker's Field, which is about 120 miles north of Los Angeles in the center of an oil region, and he acted as one of our local representatives in that area for about a year.

Mr. Bruninga: Now, Your Honor, I would like to withdraw this witness, if I may do so. One man has to get away very shortly; Mr. Ratcliffe will identify some of these papers and then I can conclude.

(Witness temporarily excused.)

Mr. Bruninga: Call Mr. Ratcliffe.

Thereupon—

GEORGE L. RATCLIFFE

was called as a witness on behalf of the plaintiff and, being first duly sworn, was examined and testified as follows:

Direct Examination,

By Mr. Bruninga:

Q. Give your name, address and your business. A. George L. Ratcliffe, General Manager, Baroid Sales Division, National Lead Company, Los Angeles, California.

59 Q. How long have you been in that position? A. Well, I have been in that position ever since the Baroid Sales Division started. I started the business originally in 1929.

Q. What is your education? A. Carnegie Tech, engineering.

Q. Did you have experience in the oil fields before you became general manager of Bariod Sales Division? A. Yes, I have been in the oil fields all my life. I started with Standard Oil of New Jersey and Pennsylvania, and then went to Texas, Texas Pacific Coal & Oil. I went to California with the General Petroleum Corporation and then we sold bentonite and barytes. Then I started this in 1929.

Q. What has been the business of Baroid Sales Division? A. Well, there never was any mud business, there was no such thing. People just used water and clay wherever they found it, to drill wells. And then we conceived the idea a scientific approach to the problem would benefit the oil industry and it was an opportunity to start a business. So we started out with two products, bentonite and barytes, and from that point in 1929 on we developed some, oh, I would say roughly about twenty products that were used in drilling mud in connection with the drilling of oil wells.

60 Q. By the drilling mud, you mean that fluid that goes down in the hole? A. The fluid pumped down in the hole to wall the hole and bring cuttings to the surface.

Q You know the standard method of procedure for testing drilling fluid as far as obtaining the filtration rate? A. Do you want to know what it is?

Q. How long has the filtration testing as shown in Plaintiff's Exhibit No. 2 that Mr. Larsen testified about, the A. P. I. standard procedure, how long has that been in effect? A. Well, do you mean the standardized procedure or the test itself?

Q. Well, the test itself, yes. A. Well, of course, we used the test before it was standardized in the field several years and after all of the oil companies used the test for several years, then we decided to standardize on it so that they could exchange results and we were talking about mud, you know, by quoting the number of centimeters, water loss, and how that mud compared with some other mud. That was standardized in 1938.

Q. Now, is that sort of a test used in the wells? A. That is used practically universally.

Q. Do they rely on it? A. Oh, yes.

61 Q. Is there any other way that they can test it except outside of the well? A. Well, no, we have to test it on the surface of the ground, you cannot get down in the well.

Q. But it is used, is it? A. It is used all the time every day by thousands of oil companies.

Q. Now, the Patent Office had some controversy about the tests that were carried on by George Miller and particularly one on manjak and gilsonite, and so forth, Plaintiff's Exhibit No. 13. Did you get a report of that test? A. Yes, I did.

Q. At about that time? A. Yes, at that time.

Q. What was the practice at Baroid Sales Company, were matters like that reported to you? A. Yes, all matters of this nature, of course, came to me practically immediately.

Q. Now, in your opinion, was that a practical demonstration of those various natural asphalts mentioned in there?

A. Do you mean that I could tell from here that those worked or just exactly——

Q. Yes, whether they worked in drilling fluids as far as filtration? A. Yes, we can tell from the test whether these materials will work in drilling mud. You see, you can tell on practically everything but chemicals. When we
62 first started out, we were not so sure what results
we were going to get when we made the test in the laboratories and then correlated that with the use of the product in a particular well. But as time went on and prior to the time we standardized on these tests, it was pretty generally acknowledged that if you made these tests on the mud, you were pretty sure you knew what was going to happen in the well, you didn't need to actually try it in a well.

Q. Well, you tried it in the well, that is the way you tested it, too, didn't you? A. Oh, yes, that is the way you test mud at the well, when it comes out of the well.

Q. Are you familiar with the vulcanization of rubber, the thumbnail or tooth test? A. Just in a very general way.

Q. Is this anywhere analogous to a test of that kind? A. I would say yes, it is a practical test, it is relied on by many people, the whole industry.

Q. Now, Mr. Ratcliffe, do you know George Miller? A. Yes.

Q. When did you meet him? A. Well, I couldn't say exactly when I met him, I know he came to see me a couple weeks prior to April 16, 1940, when he came to talk to me about this proposition of us taking on the oil base mud.

63 Q. Can you identify Plaintiff's Exhibit No. 4, a letter of April 16, 1940? A. Yes, I can.

Q. Did you sign it? A. I did.

Q. Did Mr. Miller sign the original and both copies? A. He did, that is right.

Q. Now, do you know what that application was, prepared by Lyon and Lyon? A. Yes, the patent application was prepared under our direction and under Mr. Larsen's direction.

Q. Mr. John H. Bruninga was attorney for Baroid Sales Division at that time? A. That is correct.

Q. You didn't have him used on that case at all, did you? A. No, we did not. We used Lyon and Lyon.

Q. You wanted Miller to have his own attorney handle it? A. That is right.

Q. That is what Miller wanted, too? A. Yes.

Q. Now, as far as mineral rubber is concerned, are you
familiar with the mineral rubber put out by the
64 Union Oil Company? A. Yes, I am.

Q. What is it? A. It is a blown asphalt just like a lot of other blown asphalts and that is a special name for the type of blown asphalt that is used in rubber tires and other rubber products.

Q. Mr. Ratcliffe, did Mr. Miller test out the particular drilling fluid that he had worked up? A. Yes, he did.

Q. Do you remember what it was, what kind of an asphalt it had? A. Blown asphalt.

Q. Did it have anything alse? A. Yes, it had lime.

Q. Now, do you recognize the report, Plaintiff's Exhibit No. 8, signed by George Miller in January, 1941, did you see that? A. Yes.

Q. Now, that was in January, 1941. When you started out with Mr. Miller in 1940, did you know that Shell Company had any patents? A. No, Mr. Bruninga, I did not; and the previous question, yes, I do identify this. I received it shortly after. No, I knew nothing of any Shell patents or applications.

Q. Can you identify Plaintiff's Exhibit No. 9, letter
65 of February 13, 1941, from George Miller to George
Ratcliffe? And PX 10 letter of February 19, 1941, General Manager to Mr. Miller? A. Yes, I can identify both of those.

Q. You received the one and sent the other, did you?

A. I received the one from Mr. Miller and sent the one dated February 19, myself.

Q. Mr. Miller had an idea you should fight Shell. What was your idea about that, apart from as expressed in that letter reply? A. Well, of course, Shell Company is a good customer, we don't intentionally fight any good customers.

Q. Is it the policy of Baroid Sales to infringe any patents? A. No, that is right.

Q. Now, then, did you see Plaintiff's Exhibits Nos. 11 and 12, the two letters of February 19, 1941, and March 5, 1941? A. Yes, I saw both of those.

Q. How soon did you see letters of that kind? A. Well, I saw them immediately upon receipt, this one that Larsen wrote to you, of course, a copy came to me, that would be the same day or the next day at the latest.

Q. And you saw the letter to me somewhere around
66 the first half of March, then, is that right? A. The
letter of February 19, no, I received this within a
few days of February 19.

Q. And you paid attention to those letters? A. That is right.

Q. Now, can you identify Plaintiff's Exhibit No. 14, the letter of April 16, 1941, Ratcliffe to Miller? A. Yes, I can identify it.

Q. That is a cancellation of the contract. Why did you cancel it? A. Well of course, one of the principal reasons was that we had not known about the Shell patent or any application at the time we hired Miller and thought of handling this asphalt emulsion. So the patent was issued, as I recall it, in November, somewhere along there. We probably saw it a month or so later and that kind of upset our plans a little bit because Miller was offering essentially the same thing that was patented by Shell.

Q. Now, that is in March that that test was made. The application was not filed until 1944. Of course, we all know from 1941 to 1945, we were engaged in war. How about the Baroid Sales Division, what position did they

occupy as the supplier of materials for use in drilling fluids, were they preeminent or just a small factor? A. No, we have been leaders in that business for many
years and during the war, oh, I suppose that we
67 handled possibly 75 or 80 percent of all the ma-
terials. As petroleum is very important, we imported materials and sold them at cost and did everything we could to help the war effort out. We were very shorthanded, of course.

Q. You were shorthanded, why? A. Well, most of our service engineers, of course, all our laboratory men, are college graduates and most of them were young fellows who had graduated, a lot of whom had graduated from military schools, schools that have military training. I think the first month we lost about thirty of our best men right off the bat. They were taken into the Army.

Q. Those were not all laboratory men, were they? A. No, laboratory men, executives.

Q. Was the great mass of your technical men, what was it at that time, outside the laboratories or in the field? A. They were college-trained chemical engineers.

Q. And was that a large or a small proportion of your technical men? A. Oh, a very high proportion.

Q. And those men had to go out and apply the things to the well? A. That is correct.

Q. Well, from March, 1941, to April, 1944, were you being pushed to supply materials to the oil well builders?

A. Yes, as I said before, we had to get materials.
68 Everybody was short because they wanted more
and more oil and we had to get materials anyway we could.

Q. Did you have to buy materials? A. We had to buy it, we built plants, imported some from Cuba, some from Canada, and all over.

Q. Did you have plants of your own to make the materials? A. Yes, we do.

Q. Now, in the case of this kind where it is a very nice thing, maybe, but it is not essential, what was your experience in the oil well drilling industry during that period, did they fool around with requirements like that to get them into use or did they take the standard stuff during the war years of 1941 to 1944? A. Of course, they took what was available.

Q. Yes. And was much experimenting done there on that line? A. No, practically dropped all research work during that period.

Q. What is the cost of these natural asphalts as compared with airblown asphalts, is it higher or lower? A. I am not too familiar with the cost of them, but they are higher than ordinary.

Q. They were used for things like battery cells, printing inks, and paints and varnishes, weren't they? A. That is right?

69 Q. How about the airblown, what was that the result of? A. Well, airblown asphalt is made from the asphalt you get when you refine heavy oils, you get real heavy oil and when you remove all the oil you have got an asphalt left, it is a by-product.

Q. Would you expect to buy those natural asphalts that Mr. Larsen used, those particular ones, from suppliers and go into competition with airblown asphalt? A. No, I don't believe you could, you would have to mine them yourself.

Q. You have to get your own mine, is that right? A. That is correct.

Q. Did you ever do that with barytes and bentonite, at your own mine? A. Yes, we did.

Q. Give the Court some idea what it means, what was the original cost of barytes as weighting material when it was started out and when you had to buy it from the paint companies? A. Well, originally it cost about $23 a ton, as I recall.

Q. And what has it come down to in your own mines, as far as cost is concerned? A. About $11.

70 Mr. Bruninga: That is all of this witness, Your Honor. You may cross-examine.

Cross-Examination,

By Mr. Miller:

Q. Your company was engaged in selling materials for drilling muds, was it not? A. That is correct.

Q. And you sold material for bentonite drilling muds? A. We sold bentonite for drilling muds.

Q. And barytes drilling muds? A. That is correct.

Q. Did you ever sell any materials for asphalt drilling muds? A. No, sir.

Q. You maintained a laboratory, did you not, to investigate possible new drilling muds? A. That is correct.

Q. You were investigating, were you not, according to your testimony, some muds which used natural asphalt? A. At the same time that we were investigating the muds that used the blown asphalt.

Q. Why did you think it was necessary to investigate the use of natural asphalts? A. Well, that came about because the Shell Company was issued patents covering blown asphalts.

71 Q. But you were aware, were you not, that the natural asphalts were quite expensive, didn't you so testify? A. I said that I was not very familiar with it, but I do know that it costs more. It is a question of efficiency, you see, you might be able to pay more for it and be able to use less.

Q. Then, your company was in the habit of, from time to time, bringing out new materials for well drilling muds, were they not? A. That is correct.

Q. And naturally they would try to make the sales appeal to those who were to buy these, would they not? A. Yes, sir.

Q. Would they ever attempt to persuade the purchasers to buy them on the basis that they would actually be used in an oil well to show how good they were? A. Yes, that argument would be used.

Q. Did you ever try to sell any of these new muds merely on the basis of having tested some of their characteristics in the laboratory? A. Well, we sell them both ways. We sell them through our technical bulletins that we send out to the oil companies, and naturally our sales engineers also try to, as soon as they get someone to use it, they use that as an argument to get somebody else to use some.

72 Q. Did you ever make up any of these natural asphalt well drilling fluids for sale by your company? A. Not as far as I know.

Mr. Miller: That is all.

Redirect Examination,

By Mr. Bruninga:

Q. Mr. Ratcliffe, one thing counsel asked you, whether the only way you approach somebody to sell him some material is whether you used it in an oil well. You remember the polyphosphates way back in Wayne's time in 1934; you remember those, you do, don't you? A. Yes.

Q. You remember going around with Floyd Palmer to sell them to oil companies? A. Yes.

Q. You remember that you carried the laboratory apparatus with you at that time? A. That is correct.

Q. Had there been any sale made to any oil companies before the customer took it? A. Not as far as I know.

Q. Did he take it on the basis of that laboratory experiment performed before him? A. That is correct.

73 Q. In an office; that is right, isn't it? A. That is right.

Mr. Bruninga: I think that is enough, Mr. Ratcliffe. That is all.

(Witness excused.)

* * * * * * *

75 DELMAR H. LARSEN,

the plaintiff, resumed the witness stand and was examined and testified further as follows:

Direct Examination (Resumed).

Mr. Bruninga: Your Honor, the testimony I am now about to offer on some of these patents is on this basis: The Patent Office seemed to have some idea that the public would be deprived of something by the issuance of this patent and they mentioned particularly asphalts because Mr. Miller in his patent has specified in his claims that in addition to the airblown asphalt, he could also add another asphalt. I want to show that such is not the case at all.

By Mr. Bruninga: Q. Mr. Larsen, I hand you a copy of the Swann patent, 1,455,010, issued May 15, 1923, and which expired on May 15, 1940.

Mr. Bruninga: I offer that in evidence as Plaintiff's Exhibit No. 15.

Mr. Miller: No objection.

The Court: Received.

* * * * * * *

76 By Mr. Bruninga: Q. I want you only to consider this very briefly. What does that patent disclose generally and specifically? A. This Swann patent is related to oil base drilling muds and discloses the use of tar as shown on the first page, first column.

Q. Well, that is line 25 on the first column? A. Line 25, tar either by itself or diluted by something in the nature of a solvent oil with the tar.

Q. Now, he talks about a heavy oil fraction obtained from tar distillation. Now, what is that heavier oil fractions? A. I would take that to be toluene and psilomelane, and liquids of that sort.

Q. That is a solvent, is it? A. That is right.

Q. And that is an oil base, then? A. That is right.

Q. Now, go ahead. A. On page 2, column 2, line 83, this patent also states that asphalt dissolved in benzol may be used.

Q. Is benzol an oil? A. Yes, it is a light, oily material not mixable with water.

77 Q. It is not like water and I think you said in the actual use of oil base drilling fluids, they used kerosene sometimes? A. That is right.

Q. Now, does that then disclose the employment of asphalt in an oil base? A. It does.

Mr. Bruninga: And the first claim, Your Honor, specifically as it is brought in that respect. That patent has expired. So I just want to show that the matter of having an oil base and asphalt is an expired patent.

By Mr. Bruninga: Q. Now, next as far as Miller is concerned, I want to hand you a copy of the Dawson patent, 2,223,027, patented November 26, 1940, issued to Shell Development Company. That is the subsidiary of the Shell Oil Company we have been talking about, and I hand you a copy of that patent which I offer in evidence as Plaintiff's No. 16.

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Mr. Bruninga: I want to say, Your Honor, that was cited during the prosecution of the Larsen application and also during the prosecution of the Miller application, and if counsel wants to take a look at the file, I think it will show it.

78 Will you accept that or do you want me to show you the file? I have it right here.

Mr. Miller: I will take your word for it. I don't think it makes any difference.

The Court: Received.

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By Mr. Bruninga: Q. Now, it refers to blown asphalt and what kind of a base drilling fluid is that? A. This Dawson patent refers to an oil base mud as can be seen from the third line of the patent, where it says that the present invention relates to drilling fluids of the oil base type and we see in lines 9 and 10 of the first page, first column, that:

> "Oils, e. g. mineral oils or fractions thereof such as gas oils,"

are to be used.

Q. Well, now, it refers to blown asphaltic bitumite in the first claim on page 2, right column; and on page 1, right, line 8, it refers to blown asphalt. What is the relation between those two expressions? A. Well, blown asphalt is simply a synonym for blown asphaltic bitumite.

Q. The first claim reads:

79 > "A non-aqueous drilling flund comprising oil, finely divided solid material and blown asphaltic bitumite."

What is the finely divided solid material in that case? A. Those are specifically mentioned by example on page 1, column 1, lines 8 to 9, lines 7 to 9, hematite, which is a well known weighting material, barytes, which is another weighting material, crushed oyster shells, which is a cheap form of limestone, and the like.

Q. The Miller patent refers to those solid materials also, does it not? A. The Miller patent refers to crushed oyster shells, I think it refers to another, too.

Q. Now, the Shell patent refers to a settling inhibitor, such as lamp black or carbon black, page 2, left column, last line. What does he mean by settling inhibitor? A. A settling inhibitor is something which will give gel strength or gel properties to the mud over and above what may already be contributed by the other materials there which keeps the cuttings from settling out.

Q. And your application also refers that lamp black may be used for that purpose, is that right, carbon black? A. My patent application, yes.

Q. Now, the Miller application uses what in place
80 of carbon black? A. The Miller application specifically refers to calcium oxide which is quicklime and also to hydrated lime, slake lime.

Q. But the Dawson patent issued on November 26, 1940, after Baroid Sales had made its arrangements with Mr. Miller on April 16, 1940, claims the employment of blown asphalt, is that right? A. That is right.

Q. Now, the next one I want you to just briefly consider is the Huisman patent, No. 22,681, patented November, 1940, which was also issued to Shell and which I offer in evidence as Plaintiff's Exhibit No. 17.

Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. That patent claims on page 2 in this second claim, a drilling fluid comprising a mineral oil, a weighting material——

The Court: What line is that?

Mr. Bruninga: That patent, page 2, column 2, claims in claim 2:

> "A drilling fluid comprising a mineral oil, a weighting material, and voluminuous magnesium
> 81 oxide as the sedimentation inhibitor."

By Mr. Bruninga: Q. Now, what is the relation between magnesium oxide and calcium oxide? A. They are very close in chemical and physical properties. One is not quite as strongly alkaline as the other, but they will both slake to give respectively magnesium hydroxide and calcium hydroxide.

Q. You have studied chemistry, haven't you? A. Yes.

Q. And in your opinion would calcium oxide be the equivalent of magnesium oxide? A. I think so and, in fact, I believe the Miller patent referred to yesterday states that they are substantially the equivalent when used for this purpose.

Q. Again, that patent issued on November 5, 1940, after the arrangement had been entered into with Mr. Miller, Miller used calcium oxide with blown asphalt, so in your opinion would that involve similarity as far as the Huisman patent is concerned? A. Yes, it looked pretty similar to us.

Q. Now, then, another one of the Shell patents is No. 222,989, issued November 26, 1940, to Henkes, which I will give to the Court and offer in evidence as Plaintiff's Exhibit No. 18.

82 Mr. Miller: No objection.

The Court: Received.

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By Mr. Bruninga: Q. That patent claims on page 2, right column, the employment of lamp black as a sedimentation inhibitor, does it not? A. Yes.

Q. Now, as far as the prior art is concerned, were you familiar with those patents in February, 1941? A. Yes, I was.

Q. And had you studied them? A. Yes, I had.

Q. Now, as far as those patents are concerned, summarizing then what was covered by the Shell Company was, first, the employment of blown asphalt, and second the employment of calcium oxide in the form of its equivalent, magnesium oxide. As far as you were concerned, were you advising your company to employ those two? A. After the Shell patent appeared, then my advice was that if we wanted to avoid any involvement with Shell, we had better steer clear of using those materials.

Q. Now, as far as the employment of natural asphalt is concerned, broadly that was already in the Swann
83 patent which had expired, isn't that right? A. Yes, it was in there very broadly, I would say.

Q. But as far as these three, gilsonite, manjak, and grahamite, that was not disclosed in the Swann patent, was it? A. No, they were not disclosed.

Q. And was that a blown asphalt? A. In the Swann patent?

Q. Well, were any of those three a blown asphalt? A. No, the three which you mentioned are natural products.

Q. You state in your specification it is a very narrow classification. What was the best known natural asphalt at that time? A. I had always heard of the Trinidad Lake asphalt.

Q. Well, that was used in pavement all over this country, wasn't it? A. That is right.

Q. But these three were special, is that right? A. That is right.

Q. And then you ordered those three, did you? A. That is correct.

Q. Did you find any distinction between those three and
the natural asphalt of the Trinidad type as far as
84 behavior in the drilling fluid is concerned? A. Yes,
I think we showed the data on that yesterday, these three were of such a nature that they gave a zero filter loss, while the Trinidad asphalt gave a substantial filter loss.

Q. As far as blown asphalt is concerned, was there any distinction between these narrow three in the natural asphalt line? A. Yes, as we stated more in detail yesterday, these three gave zero filter loss without geling the mud up appreciably.

Q. Now, was it your idea, in obtaining a patent for this, to prevent the public from thereafter using a natural asphalt generally? A. No, I don't think that could be done.

Q. The Swann patent would block that, wouldn't it? A. I think so, yes.

Q. And you knew of the Swann patent, didn't you? A. Yes.

The Court: Is that a contention of any importance to the case?

Mr. Bruninga: The Examiner seems to take the queer position that by issuing the patent to us, the public will someway be deprived of something.

The Court: That will be the result of it, but has his intention anything to do with it?

85 Mr. Bruninga: Well, that is right.

The Court: The result of it might be of some importance according to the Patent Office, but I don't think his intention has anything to do with it.

Mr. Bruninga: The reason I framed it that way, Your Honor, was because I did not want to ask him any conclusions of law.

The Court: Very well.

Mr. Bruninga: But Your Honor is right on that.

By Mr. Bruninga: Q. Let's take up very briefly again the three Miller patents. You have them there. Take the first patent, No. 2,316,967. A. Yes, I have a copy.

Q. The specification on page 2, the left column, line 56, refers to "either airblown asphalt or mineral rubber." I note that the original description of Miller says "airblown asphalt or mineral rubber." Now, you stated yesterday that the mineral rubber meant airblown asphalt, is that right? A. That is right.

Q. Well, as one who was familiar with the art at that time, would you consider those two, airblown asphalt or mineral rubber, as being different things except they were
sold by different companies? A. No, I think air-
86 blown asphalt is a broader term, mineral rubber
being a particular sort of blown asphalt.

Q. How do you mean a particular sort? A. Well, blown to a higher melting point.

Q. By the Union Oil Company, in that case? A. Well, by the Union Oil Company, although they did not have any monopoly of that word. The word mineral rubber was used by more than one asphalt manufacturer at the time.

Q. I see. Now, I want to come to that. Did you communicate with anybody in that respect, outside of the Union Company, what was meant by mineral rubber? A. Just recently we wanted to check into the prices of air-blown asphalt and I had our purchasing agent make two or three local inquiries.

Q. Well, you gave me a letter of October 13, 1950, by Douglas Oil Company of California to the Baroid Sales Division, which I want to offer in evidence as Plaintiff's Exhibit No. 19.

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Mr. Bruninga: Just hand it to the Court, because it is self explanatory.

The Court: Very well.

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87 By Mr. Bruninga: Q. Referring again to the Miller patent, No. 2,316,967——

The Court: Has that been offered in evidence?

Mr. Bruninga: Yes, that is Defendant's Exhibit No. A, that is the one relied upon by the Patent Office.

By Mr. Bruninga: Q. With asphalt in the Swann patent and the airblown asphalt in the Dawson patent, what is that patent really directed to, as far as you can see? A. The Miller patent?

Q. Yes; make it very brief. A. Well, the whole idea of this patent as I see it, and particularly as I see by reading the claims, is the use of calcium oxide to react with the water which may have gotten into the mud.

Q. Do any of the claims mention an asphalt by itself without something with it, or without calcium oxide? A. The only place where I see asphalt mentioned, is in claims 5 and 6, and in both cases the important point seems to be that some unslaked calcium oxide is present.

Q. Never by itself, the asphalt by itself? A. No.

Q. Now, take up very quickly Defendant's Exhibit B, Miller Patent No. 2,316,968, and refer to page 3, to the claims. Do you find any claim there that does not describe an airblown asphalt as one of its parts? 88

A. No, all of these claims relate to a particular type of blown asphalt.

Q. Claim 4, however, mentions in connection with airblown asphalt "a natural asphalt." That could be the Trinidad asphalt, could it not be? A. Yes, particularly in view of page 2, column 1, lines 72 and 73, where "natural lake asphalt, etc.," are given as examples of natural asphalt.

Q. Give that page and line again. A. Page 2, column 1, lines 72 and 73.

Q. Now, the natural lake asphalt, what is that? A. Mostly that would refer to Trinidad Lake asphalt, but there are other smaller lakes of asphalt even in California.

Q. But he does mention there as natural asphalt, gilsonite, glance pitch, and some types of grahamite. Now, glance pitch is what? A. Manjak.

Q. Does he mention their use alone at all in that patent? I refer particularly to that part that continues there. A. No, as a matter of fact, the bottom of column 1 of page 2 and the top of column 2 of page 2 seems to express his idea that they would not be very good by themselves.

89 Q. Now, refer to the third Miller patent, No. 2,356,776, Defendant's Exhibit C. Is there any claim there which mentions that asphalt or even airblown asphalt by itself? A. No, I find that calcium oxide is mentioned in each claim of this patent.

Q. Did Miller suggest to you the employment of gilsonite, manjak, or grahamite, and by manjak I mean the other word for glance pitch? A. No, as I stated yesterday, I suggested that to him, on the contrary.

Q. Did you tell him to use those particular materials? A. Yes, I did.

Q. And they are included in Plaintiff's Exhibit No. 13? A. Yes.

Q. Did you see the draft of the first application of the first patent? A. Of Miller?

Q. Yes. A. Yes.

Q. That is the one that we had in here as Plaintiff's

Exhibit No. 6, is that right? A. Yes, that is, I saw the first draft, I did not see the final draft as it was sent over to the Patent Office.

Q. Is there any particular difference between that
90 first draft and that first application? A. I have
not compared them in detail, but I don't think there is too much difference.

Q. Did you see the application of the second Miller patent, No. 2,316,968? A. No, I did not see that at any time and I had no idea of what it contained until the patent itself appeared.

Q. Did you see the application of the third Miller patent, No. 2,356,776, before the patent issued? A. No, I did not. I did not know that had even been filed until it appeared.

Q. Miller was with you about a year after that test of Plaintiff's Exhibit No. 13 was performed, wasn't he? A. He was with the company a little more than a year after that. I believe it was just three or four months after that test that we sent him up to the San Joaquin Valley.

Q. Did he tell you he was to include those three, gilsonite, manjak or grahamite in these applications? A. No, he did not.

Q. Now, as far as the tests that Miller performed, what was your opinion of those, were they successful or not successful? A. You mean all of the tests taken as a whole?

Q. Yes, I mean the tests, Plaintiff's Exhibit No. 13, this particular test of gilsonite, manjak and grahamite. A. I thought it was quite successful.

91 Q. Now, as far as relates to delay in filing the appli-
cation, I don't want to ask you anything that Mr. Ratcliffe testified about, are you familiar with what is required in order to get into the production of a thing like one of these asphalts for well drilling purposes? A. Yes, I am.

Q. Now, take for instance the matter of supplying barytes which is used in the paint trade, which sold for quite a lot of money and which had to be brought down to sell for the purpose of use in a well, is that right? A. That is true.

Q. And that was true of bentonite also, wasn't it? A. That is true.

Q. Did Baroid Sales Company have its own deposits of barytes and bentonite? A. Yes, we find for these materials which we sell in large volume, it is just about absolutely necessary for us to be primary producers ourselves or we cannot compete in the market.

Q. Now, Mr. Ratcliffe mentioned you bought some of that barytes, perhaps some of that bentonite. Did you buy the barytes from the paint trade? A. During the war years, we bought barytes over and above our own capacity to produce, from other suppliers. It was not from
92 the paint trade, it was simply from other suppliers of barytes.

Q. Now, Mr. Ratcliffe, I think, mentioned that you have to have it mined. Did you explore for any deposits of these, gilsonite, manjak and grahamite? A. Not at that time. We made some field reconnaissance in about 1946 or thereabouts.

Q. That is after the war was over? A. That is right.

Q. Now, where was gilsonite found? A. Gilsonite seems to occur only in Utah.

Q. How about manjak or glance pitch? A. Manjak, we understand, occurs in Cuba and other parts of South America.

Q. How about grahamite? A. Grahamite is not too frequently encountered, I believe there are deposits in Arkansas.

Q. Now, those three, do they occur on the surface where you can pick them right up like is often the case with coal or even barytes? A. Not exactly. Gilsonite occurs in deep and quite narrow vertical veins that run for long distances across country. It is necessary to set up a rather specialized mining procedure to clean the gilsonite out of the fissure or vein.

Q. After you have it on top of the ground, you can

93 sell it in lumps to the oil trade? A. No, you would have to cut it and perhaps dress it a little, depending on how good your mining operation was and then grind it up.

Q. What do you mean by dressing? A. Get rid of the non-gilsonite materials, such as rock.

Q. What would the equipment for such a thing cost? A. For a substantial operation, including mining and hauling and dressing and crushing and grinding equipment, I suppose anywhere from one hundred to two hundred thousand dollars on up.

Q. Is that based on any experience that you have had in other materials? A. Yes, it is based on experience that we have had in several other non-metallic minerals.

Q. Now, then, how do you furnish these materials to the oil well trade, just load it in box cars? A. No, all of the dry materials that we sell are sacked and then loaded into box cars.

Q. Does that require any equipment? A. Yes, that requires grinding and sacking.

Q. Do you have such grinding and sacking equipment in your business? A. You say, "Did we"?

94 Q. I mean with your other materials. A. Yes, we have in connection with each particular mill for a particular material, we have grinding and sacking equipment.

Q. What does a typical equipment like that cost, in order to get it into the sacks quickly? A. You mean just the sacking equipment?

Q. Yes, for sacking, the sacking equipment? A. Well, the sacking equipment itself is not very expensive, I suppose $10,000 for an automatic packer.

Q. Now, during the war years, 1941 to 1944, this application was filed in April, 1944, was equipment available? A. New equipment of that type was just about impossible to get. There was, of course, always some second-hand equipment on the market, if you were lucky in finding it, generally at inflated prices.

Mr. Bruninga: That is all.

Cross-Examination,

By Mr. Miller:

Q. Mr. Larsen, the invention here in controversy as set forth in your claims, relates, does it not, to the use in an oil base well drilling fluid of a natural asphalt? A. Yes, of a specified group.

Q. It was old prior to your entrance into the field of
this alleged invention, was it not, to use blown
95 asphalts in these kinds of drilling fluids? A. Yes,
it was.

Q. And even before you thought of these particular natural asphalts, it had been proposed in the prior art, had it not, to use natural asphalts with drilling fluids? A. Do you refer to the Swann patent?

Q. No, I am not referring to any particular patent. Just at the moment, I am merely asking you whether it was old to use the natural asphalts or whether it was not. Do you know whether it was or was not? A. At the time I made this invention, it was certainly new to me.

Q. But you were testifying about Plaintiff's Exhibit No. 16, the Dawson patent, No. 2,223,027, were you not? A. Yes.

Q. And will you look at that patent on the first page of the first column, beginning at line 14, that patent states, does it not, it has always been proposed to add natural or synthetic asphalt? A. I guess it does.

Q. And this patent was issued November 26, 1940, was it not? A. That is right, I guess this was known to me at that time.

Mr. Bruninga: Your Honor, I want to call atten-
96 tion to the fact that here is a statement in a patent
issued in November, 1940, and a statement of sup-

posed fact that it has been used. Now, the disclosure of natural asphalt, that of course is disclosed in the Swann patent, but when he talks about a use, which he is asking Mr. Larsen about, that is a different thing. This is secondary evidence or hearsay.

Mr. Miller: You introduced the patent in evidence, did you not?

Mr. Bruninga: Oh, yes.

Mr. Miller: I can cross-examine about what it says?

Mr. Bruninga: Oh, yes.

Mr. Miller: And it is a printed publication, is it not?

Mr. Bruninga: Oh, yes, sure.

By Mr. Miller: Q. Now, Mr. Larsen, you are skilled in the art of the substance as used in well drilling fluids, are you not? A. Yes, I have always thought so.

Q. And will you take it that when a person mentions just asphalt, he has any particular substance in mind or are there different kinds of asphalt? A. There are many different kinds of asphalt.

Q. And if he said natural asphalt, he would limit the disclosure over the broad terms of asphalt down to some specific kind of asphalt, would he?

A. Could I have the question again?

97 The Court: Will the reporter please read the question?

(The question was read.)

The Witness: I think if a person said natural asphalt, he would mean to exclude those asphalts occurring as a result of refining crude oil.

By Mr. Miller: Q. Then, Mr. Larsen, to you, as one skilled in the art, if one mentioned natural asphalt, what substance would come to your mind as falling within that group? A. Well, the first thing that would come to mind would be the Trinidad Lake asphalt, and then——

Q. Have you any others? A. Yes, as a small boy, I fell in a tar pit once, which occurs in the Los Angeles area. There are several other occurrences of natural asphalt in

California. And then I suppose if I looked farther, I would turn up all of the other things called natural asphalts.

In connection with this Dawson patent, if I may make a comment, it appears from column 1, page 1, line 50, that Dawson uses these blown asphalts to obtain plastering properties and muds, but this reference which you point out to me on page 1, column 1, line 15, he says that natural asphalt has been proposed for use to improve the plastering properties. So, whatever Dawson adds the blown asphalt for, he suggests the use of the natural asphalt for the opposite thing, it seems to me. 98

Q. Mr. Larsen, we were talking about certain tests yesterday. I understood you to say, did I not, that certain blown asphalts gave good plastering properties? A. That is correct.

Q. Now, referring to these tests which were on the data sheets prepared with your affidavit in the Patent Office, is it not true that the thirty-minute throughput for Trinidad Lake asphalt in the amount of 13 percent, was given as 3.6? A. That is correct.

Q. And that was contrasted with a value of zero for grahamite, zero for manjak, and zero for glance pitch? A. That is correct.

Q. Now, after all, Mr. Larsen, is that difference between zero and 3.6 any very great difference? Twenty-five percent would be a substantial difference, wouldn't it? A. Well, there are ratios infinity.

Q. But 3.6 is not very far from zero, is it? A. Well, it depends on the unit, supposing we talk in terms of cubic milliliters, then we would have 3,600 for the Trinidad Lake asphalt and we would still have zero for the materials of this application.

Q. Now, Mr. Larsen, when you had these tests made by Mr. Miller, you stated, did you not, that you thought the results of these tests were very satisfactory, you made that statement, did you not? A. I thought so and I still think so. 99

Q. Did you tell that to anyone, or did you just keep it in your mind? A. Well, I don't remember, but I would suppose that I did mention it.

Q. Was there any problem with the use of blown asphalt which you thought might be solved by shifting over to these particular asphalts here? A. I thought that it would solve first the problem of our being able to go into the oil base fluid business without becoming involved in any way with the Shell patents, and second, I thought that it offered an improvement over blown asphalt because it was possible by the use of these materials to get a zero throughput, that is, a zero filter loss without disturbing the gel characteristics of the mud.

Q. And although you thought there was an improvement and although you thought possibly it solved the problem, you did not tell anybody about it? A. Oh, I think, I don't remember whom I might have told, but I am willing to believe that I did discuss it with my superiors.

Q. You did not make any attempt to try it in a well at that time? A. No.

100 Q. Did you ever make any attempt to try it in a well since then up to now? A. No, we don't have any wells ourselves to try it in.

Mr. Bruninga: Are you through with this line of cross-examination?

Mr. Miller: I am not through.

Mr. Bruninga: I don't want to make any objection, because this is cross-examination.

Mr. Miller: Yes, of course it is.

By Mr. Miller: Q. You were testifying about gilsonite occurring in Utah. Was Utah the only place you could have gotten hold of some of that? A. So far as I know now and knew at the time, Utah is the only place where gilsonite occurs.

Q. Didn't you file with your affidavit in the Patent Office a letter dated February 27, 1941, from the Utah Gilsonite Company in response to inquiry——

Mr. Bruninga: Your Honor, do you find that in Plaintiff's Exhibit No. 1, because it is very handy there?

Mr. Miller: Yes, it is right in the application file.

The Court: What page?

Mr. Bruninga: I will come up there and find it for you, Your Honor.

101 By Mr. Miller: Q. Mr. Larsen, this letter was directed to your attention, was it not? A. That is right.

Q. And it told about how they sold gilsonite by carload lots and after saying that the minimum carload is 30 tons they said this, didn't they, if it was your intention to resell the gilsonite you would not have a chance in the world to compete with existing stocks in Los Angeles unless you did purchase a carload? A. Yes.

Q. They told you then, didn't they, that you could get gilsonite from existing stocks right in Los Angeles, didn't they? A. Oh, yes, and as a matter of fact, I checked with some of the brokers, those with small warehouse stocks held by brokers, one I remember was the firm of Marshall, Dill & Company. They sold that material locally in small lots of one bag up, to paint and varnish companies and the like. I daresay you could find a stock of gilsonite in Washington, D. C., here.

Q. But notwithstanding that this material was readily available there right in the town of your company, you did not make any attempt to, did you, either yourself or have anyone else, try some of it in an oil well, did you?

A. Well, the problem of trying it in an oil well was 102 not getting a stock, that is the simplest thing. The problem is finding the owner of an oil well being drilled to clear out the mud in his well and put in a quantity of mud which we would recommend, those quantities being of the order of magnitude of thirty or forty thousand gallons.

Q. They are starting new oil wells right along out there, aren't they? A. Oh, they are, indeed.

Q. You had something which, according to your statement, you thought was an improvement, didn't you, and solved a problem? A. That is true.

Q. But you never suggested to anyone that even when he was making a new oil well, it might be well to try this and see how good it was, did you? A. No.

Mr. Miller: That is all.

Mr. Bruninga: Your Honor, I did not want to object at the time he was in cross-examination, but keep this in mind, the Patent Office has never questioned that the use of these three limited materials involve the invention over the use of natural asphalt generally. So, all that counsel was cross-examining Mr. Larsen about is immaterial to this case. I just want to make that notation, they have never questioned the patentability.

103 The Court: Did you want to ask another question of the witness?

Mr. Bruninga: Yes.

Redirect Examination,

By Mr. Bruninga:

Q. Now, Mr. Larsen, does the Dawson patent disclose gilsonite, manjak or grahamite? A. No.

Q. Now, counsel asked you about the difference between 3.6 and zero as far as loss is concerned. In the matter of fluid loss generally in oil wells, is the difference between 1.1 and 5 considered material for instance, in water loss generally? A. Yes, even that is considered substantial.

Q. Where you have 3.6 fluid loss, what happens to the kerosene? A. Well, with a fluid loss of 3.6, that means that as the hole is being drilled, the oil seeps into the formation at a slow but appreciable rate and slowly builds up a filter cake on the outside of the bore hole.

Q. All right, now, Mr. Miller told you there were a lot of oil wells being started and I suppose he meant that you could use it at that time. When is this material used, in

the starting of an oil well or after you reach the pro-
104 duction formation? A. Oil base muds are generally used only after the producing formation is reached, because those are the formations that it is particularly important to protect from the exudation of water from the mud.

Q. Now, as far as being available in Los Angeles is concerned, was it available at a price you could dump in an oil well? A. No, it was available at a broker's l. c. l. price, I suppose that that price in itself was not a great bar.

Mr. Bruninga: That is all.

The Court: That is all, step down.

(Witness excused.)

Mr. Miller: Your Honor, just as a formal matter, I have already handed up a folder with defendant's exhibits. I want to be sure it is formally presented as our evidence and that will be our case.

The Court: Very well.

(Patent Office folder was marked Defendant's Exhibit No. 1 and received in evidence.)

PLAINTIFF'S EXHIBIT 1.

Pending Application of

Delmar H. Larsen,

Filed April 17, 1944, Serial Number 531,494,

for

Improvement in Employment of Non-Aqueous Well Drilling Fluids.

* * * * * * *

This invention relates to the art of drilling fluids used in the rotary method of drilling earth wells, as for oil and gas, and in particular relates to improvements in such drilling fluids made with an oil base instead of a water base.

The general features of rotary drilling are well-known and will be referred to only briefly here. A drilling fluid is circulated down through a drill pipe at the bottom of which is a bit provided with exits for the fluid, which latter then rises in the annular space between the drill pipe and the walls of the borehole to the surface, where after being freed of detritus it is circulated down the drill pipe. The circulation takes places continuously while the drill pipe is simultaneously rotated. The ordinary drilling fluid consists essentially of a suspension of clay in water, in some cases together with other additive agents such as weighting materials, emulsoid colloids such as bentonite or organic colloids, mud thinners and other materials. Such fluids have some disadvantages, the chief of which is that it is often considered undesirable to drill into an oil bearing zone with an aqueous fluid. Also, aqueous fluids, unless carefully prepared and controlled, tend to allow shaly formations penetrated to swell, thus endangering the success of the drilling operation.

In order to avoid the use of an aqueous drilling fluid many alternatives have been suggested and used; thus the practice has arisen of using oil instead of water as the drilling mud fluid base. The oils used are generally hydrocarbon oils and may range from crude oils to fairly light distillates. Drilling with plain oil is scarcely more satisfactory than drilling with plain water, so that in recent years a number of so-called "oil base drilling fluids" have been developed in which the desirable physical properties of the water base fluids such as high density, plasticity, thixotropy and infiltrability have been sought to be attained by the use of additive agents particularly suited to the oleaginous environment. An oily base, such as a light fuel oil derived from crude oil by distillation, has been compounded with materials which disperse in the oil with a tendency to form gels rather than sols, and thus impart both infiltrability and plasticity. Examples of the latter are calcium and magnesium hydroxides and oxides, lampblack, blown asphalt, alkali metal, and heavy metal salts of organic acids of relatively high molecular weight such as oleates, stearates, naphthenates and the like, and similar materials. Such a mud fluid if used by itself will generally be too low in specific gravity; accordingly, a weighting material such as barytes, pyrite, galena, limestone, oyster shells, spent refinery clay, and the like have been added. These weighting materials are held in suspension by the gel properties imparted by the materials previously referred to, although it is highly advantageous to have the weighting material of not too strongly hydrophilic character.

One of the most important single characteristics of a drilling fluid is its infiltrability, by which is meant its ability to resist filtration. In the ordinary process of rotary drilling, an excess hydrostatic pressure exists between the fluid in the hole and the porous formations penetrated. The result is that the fluid phase of the drilling fluid escapes into the porous formation, leaving behind all of the solids in the fluid, including most or all of the colloids. This behavior is almost equally deleterious both in the case of the water base and the oil base fluid, because if allowed to occur unchecked the resulting filter cake which buids up on the walls of the hole can attain such proportions that it will pack off and stick to the drill pipe and bit when an attempt is made to withdraw these from the hole. Moreover, the fluid escaping into the formation can, for example, swell shales if containing water, and disintegrate them if containing oil. Thus, in both types of drilling fluids it is extremely desirable, and in the case of drilling in certain difficult areas it is absolutely necessary, to provide a fluid of which the filter cake is so highly impermeable that continued filtration is more or less completely inhibited. In the ordinary type of oil base mud fluid this is achieved with some measure of success, but unfortunately the materials which successsfully yield infiltrability to an oil base drilling fluid also impart geling properties to the fluid, so that even under favorable circumstances it is seldom possible to achieve as low a fluid loss as would be desirable or even necessary, because excessive plasticity results when an attempt is made to add sufficient of the agent to increase the infiltrability.

One of the objects of the invention is to provide a means for increasing the infiltrability of an oil base drilling fluid while at the same time not increasing its plasticity appreciably. Another object to the invention is to provide a novel means for increasing the infiltrability of an oil base drilling mud.

Other objects will appear as the description of the invention proceeds; it will, however, be understood that this invention is susceptible of various embodiments, within the scope of the appended claims.

In accordance with an illustrative embodiment of this invention, a natural solid asphaltic mineral of the type or class of gilsonite, manjak, glance pitch, and grahamite, is incorporated with an oil base to form a drilling fluid. Materials of this class form a unique division in the group of naturally occurring hydrocarbon minerals. As regards their behavior in an oil base drilling fluid, they can be distinguished sharply from natural asphalts, such as that occurring in the asphalt lake in Trinidad, by their property of reducing filtration to substantially zero. Natural asphalts such as the Trinidad asphalt give a substantial filter loss which would defeat the purposes of the present invention. Materials of the class with which this invention is concerned may be distinguished on the other hand from refined asphalts such as either steam refined or air-blown, in that in the case of the steam refined asphalts the filtration is again high as in the case of the natural Trinidad asphalt; likewise in that, in the case of the air-blown asphalts, while the latter yield good infiltrability they also yield considerable gel strength or plasticity to the fluid, which as has been noted above limits their use.

The following table gives examples of typical oil base drilling fluids, showing not only those which can be made up in accordance with this invention, but also, for comparison, fluids made up with natural asphalt and air-blown asphalt. In these examples 4% of slaked lime is used to give suspending properties, and approximately 33% of finely ground calcium carbonate derived from oyster shells is used to give body to the mud and increase its density. The 60-minute fluid loss was determined by the standard method of the American Petroleum Institute at room temperatures and 100 lbs. per sq. in., while the gel strengths were determined with a Stormer viscosimeter, again using the standard method of the American Petroleum Institute:

Composition of Fluid												
Slaked lime	4	4	4	4	4	4	4	4	4	4	5	4
Stove oil	50	50	50	50	50	50	50	50	50	50	50	50
Ground oyster shells....	33	33	33	33	33	33	33	33	33	33	31	33
Gilsonite, MP. 300°-340° F.	13	...	...	...	...	...	...	...	...	...	...	...
Gilsonite, MP. 300°-325° F.	...	13	...	...	...	...	...	...	...	...	...	...
Gilsonite, MP. 370° F...	...	...	13	...	...	...	...	...	...	...	...	...
Gilsonite, MP. 380° F...	...	...	...	13	...	...	...	...	...	...	...	...
Gilsonite, MP. 330° F...	...	...	...	...	13	...	...	...	...	...	...	...
Manjak (glance pitch)..	...	...	...	...	...	13	...	...	...	...	...	...
Grahamite	...	...	...	...	...	...	13	...	...	...	...	...
Trinidad Lake Asphalt..	...	...	...	...	...	...	...	13	...	...	...	...
Steam refined asphalt, MP. 165° F. Pen. 6-7..	...	...	...	...	...	...	...	...	13	...	...	...
Steam refined asphalt, MP. 165° F. Pen. 6-7..	...	...	...	...	...	...	...	...	...	13	...	...
Air-blown asphalt, MP. 232°, Pen. 16.....	...	...	...	...	...	...	...	...	...	...	14	...
Air-blown asphalt, MP. 270°, Pen. 10.....	...	...	...	...	...	...	...	...	...	...	...	13
Properties of Fluid												
Filtration Loss cc. in 60 min. test.	Nil	Nil	Nil	Nil	Nil	Nil	Nil	3.6	25.	75.	Nil	Nil
Gel Strength at room temperature	Nil	Nil	Slight	Slight	Nil	Nil	Nil	Nil	Nil	Slight	High	Very High
Gel Strength at 200° F..	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Med. High	High

The materials forming the subject of this invention are readily obtainable, particularly in the United States, and are commercially available at a reasonable cost. Many different grades of these materials are available, particularly in the case of gilsonite; however, it has been found that the ordinary commercial grades appear to work about equally well. The hydrocarbon minerals of this invention being solids can either be dissolved for use in a light hydrocarbon oil such as the oil to be used as the base of the fluid, or may be finely ground, particularly when ground with other of the solid materials of the mix, whereupon good dispersion can be readily obtained in the oil to be used.

The addition of the materials of this invention serves the primary purpose of increasing the infiltrability of the fluids to which they are added, so much so, as seen from the table above, that no filtration can be detected in a filtration test of one hour's duration. It will be evident that should other properties be desired in the fluid, other ingredients may be added to secure them. For example, if high gel strengths, particularly at higher temperatures, are desired, various of the plasticizing ingredients named hereinbefore can be added, as is well known to the art. Weighting materials, such as heretofore enumerated, can also be added to give any desired weight. Suspending or dispersing agents, such as heretofore enumerated, can also be added. Most of the materials of this invention will tend to increase the viscosity of the fluid at room temperature, although this effect disappears at even moderately elevated temperatures the gel strength imparted by these materials is nil, or in any case wholly negligible. The natural asphalt may be compounded with the suspending agent, or with the weighting material, or with both, to provide a prepared material designed for addition to the drilling fluid, or to the non-aqueous vehicle, such as a mineral oil.

Having thus described the invention, what is claimed is:

1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.

2. An oil-base well-drilling fluid comprising a mineral oil vehicle and a natural aphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.

3. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss, and a suspending agent of the character described dispersible in oil.

4. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss, and a weighting material of the character described dispersible in oil.

5. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.

6. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising, adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of

gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss, and a suspending agent of the character described dispersible in oil.

7. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising, adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss, and a weighting material of the character described dispersible in oil.

* * * * * * *

In the United States Patent Office.

Delmar H. Larsen	Div. 64
Serial No. 531,494	Room No. 267
For: Employment of Non-Aqueous Well Drilling Fluids	Filed: April 17, 1944

Affidavit Under Rule 75.

State of California }
County of Los Angeles } ss.

Delmar H. Larsen, being duly sworn, deposes and says that he is the applicant in the above entitled application; he further deposes and says as follows:

I am now and was prior to June 24, 1941, Manager of Research and Development of Baroid Sales Division of National Lead Company, with headquarters and research laboratories located at Los Angeles, California. The principal business of Baroid Sales Division is oil well drilling mud materials and services, and the principal problems dealt with in the research laboratories are connected with problems of drilling muds, both ordinary water base and also oil base muds.

Prior to June 24, 1941, I conceived, disclosed and reduced to practice, all in this country, the subject matter of the claims now pending in the application, and I do not know and do not believe that the invention has been in public use or on sale in this country, or patented or described in a printed publication in this or any foreign country for more than one year prior to this application, and that neither I nor my assignee has ever abandoned this invention.

As facts showing completion of such invention, I state the following:

The subject matter of the present application was disclosed by me to George L. Ratcliffe, General Manager of Baroid Sales Division, prior to June, 1941. Additionally, I wrote several letters to suppliers of gilsonite, grahamite and manjak, or glance pitch, requesting samples. A photostat of our file copy of such a letter to the Allied Asphalt and Mineral Corporation, dated February 19, 1941, and of a letter to the Utah Gilsonite Company, dated February 25, 1941, together with the replies thereto, dated respectively February 24, 1941, and February 27, 1941, are attached to and made a part of this Affidavit.

In 1940 we hired the George Miller, who is the patentee of the Miller patents cited, as a chemist, and he was assigned to work in the Los Angeles laboratory under my direct supervision.

The matter of this invention was also disclosed to Mr. George Miller, and he was directed by me to compound oil base drilling muds containing the conventional nonbituminous materials and containing also various samples of gilsonite, grahamite and manjak, or glance pitch. Mr. Miller proceeded with this work under my direction and supervision, and, prior to June of 1941, submitted a report to me showing the results obtained. A photostat of data sheets Nos. 1 and 2 of this laboratory report showing reduction to practice in this country is attached to and made a part of this Affidavit.

Delmar H. Larsen.

Subscribed and sworn to before me this 1st day of March, 1945.

My commission expires July 27, 1948.

A. D. West,
Notary Public in and for the County of
Los Angeles, State of California.

My Commission Expires July 27, 1948.

February 19, 1941.

Allied Asphalt & Mineral Corporation
Broadway and Vesey Street
New York City

Gentlemen:

We are interested in receiving samples (about one pound each) of grahamite and manjak, together with quotations on these products in ton lots. We naturally will expect to defray the cost of sending us any samples you have of different grades of these materials.

Yours very truly,

California Talc Works,
National Lead Company,

DHL:hb D. H. Larsen.

Allied Asphalt & Mineral Corporation
217 Broadway
New York, N. Y.

February 24, 1941.

California Talc Works
837 Jackson Street
Los Angeles, California

Att: Mr. D. H. Larsen

Gentlemen:

We are pleased to have your enquiry of February 19th and under separate cover we are forwarding samples as follows:

#10 Manjak

Packages: Bags containing approximately 250 pounds.

Price: Ton lots 4½¢ per pound.

#525 Grahamite

Packages: Bags containing approximately 200 pounds.

Price: Ton lots 2½¢ per pound.

Remarks: Because of its poor solubility, very little Grahamite is used commercially, and therefore the only stock which we have on hand at present, subject to prior sale, is a carload. After this material has been disposed of, we do not believe any further quantities will be available.

Prices quoted are f. o. b. our factory Dunellen, N. J., gross for net.

Samples will go forward on a "no charge" basis.

Thanking you for your enquiry, we remain

Very truly yours,

Allied Asphalt & Mineral Corp.,
O. G. Clement,
Sales Manager.

OGC:MBC.

U. S. C.—samples.

February 25, 1941.

Utah Gilsonite Company
Wainwright Building
St. Louis, Missouri

Gentlemen:

We are interested in receiving samples of any gilsonite which you offer for sale. If possible, we should like to receive 6 to 8 one-pound samples of selects and standard grades covering a range of softening points from approximately 265° F. to 500° F., together with prices on the various grades sent in ton lots.

Naturally, we expect to defray the cost of these samples.

Yours very truly,

Baroid Sales Division,
National Lead Company,

DHL:hb

D. H. Larsen.

Utah Gilsonite Company
Capital $250,000.00
Wainwright Building
St. Louis, U. S. A.

Feb. 27, 1941.

Air Mail

Baroid Sales Division,
National Lead Co.,
830 Ducommun St.,
Los Angeles, Calif.

Attention: Mr. D. H. Larsen

Gentlemen:

We thank you very much for your inquiry of the 25th, and in that we have eight grades available, are wondering if you desire six to eight 1 lb. samples of each, which would result in sending you 48 to 64 bags.

We assure you we will cheerfully furnish any reasonable quantity of Gilsonite for samples "gratis" but, unfortunately, we carry no stocks west of Utah, and less than carload rates would be prohibitive.

The minimum carload is 30 tons, and if it is your intention to resell the Gilsonite you would not have a chance in the world to compete with existing stocks in Los Angeles unless you did purchase a carload. On the other hand, if you are actually going to place your purchase into production you may not be warranted in buying a carload.

We will appreciate an early reply.

Yours very truly,

Utah Gilsonite Company,
Per: F. J. Roethig.

FJR:GC
CC Via reg. mail

Test No. S. T.

Sheet No.

Laboratory

DATA SHEET

EFFECT OF NATURAL ASPHALTS

GILSONITE

MATERIALS	%	%	%	%	%	%	%	%	%	%
$CA(OH)_2$	4.0	8.0	20.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
SHELL STOVE OIL				50.0	50.0	50.0	50.0	50.0	50.0	50.0
UNION STOVE OIL	50.0	50.0	48.0							
GROUND OYSTER SHELLS		28.0	18.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
U. S. $CACO_3$	33.0									
GILSONITE (SELECT)	13.0	14.0	14.0							
GILSONITE (M.P.300-325°F)				13.0						
GILSONITE (M.P. 370°F)					13.0					
GILSONITE (M.P. 300-340°F)						13.0				
GILSONITE (M.P. 350°F)							13.0			
GILSONITE (M.P. 340°F.)								13.0		
GILSONITE (M.P. 380°F.)									13.0	
GILSONITE (M.P. 333°F)										13.0
VISCOSITY AT ROOM°	39.0	----	72.5	280.0	>400.	149.0	>300.	149.0	230.5	79.0
VISCOSITY AT 200°F.	4.0	4.0	6.0	6.0	8.5	5.0	6.0	6.0	5.0	4.0
VISCOSITY AT 260°F.	2.5	2.5	3.2	4.0	4.0	2.5	4.0	3.0	2.5	2.5
60 MINUTE THROUGHPUT	ZERO	2.7	8.8	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO
GEL AT ROOM°	NIL	NIL	NIL	NIL	WEAK	NIL	POOR	NIL	POOR	NIL
GEL AT 200°F.	NIL	NILQ	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
GEL AT 250°F.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
GEL AT 260°F.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

FORM L-9 4M 3-39

Test No. S. T. 2

Sheet No.

Laboratory

DATA SHEET

EFFECT OF NATURAL ASPHALTS

Materials	%	%	%	%	
$Ca(OH)_2$	4.0	4.0	4.0	4.0	
Shell Stove Oil	50.0	50.0	50.0	50.0	
Ground Oyster Shells	33.0	33.0	33.0	33.0	
Trinidad Lake Asphalt	13.0				
Manjak No. 10 (Glance Pitch)		13.0			
*Granamite			13.0		*Only about 80% of Granamite melted and cut-back with oil, remainder intumesced.
Manjak (Glance Pitch)				13.0	
Albertite Wurtzilite Granamite	Heated to over 700°F. and would not melt. Would not cut-back with stove oil. Tend to intumesce upon heating.				
Asphaltum (Ventura Co.)	Would not dissolve in CS_2 or oil. (Solid Rock).				
Viscosity at Room°	8.5	185.5	11.5	112.5	
Viscosity at 200°F.	2.0	6.0	2.5	4.0	
Viscosity at 260°F.	2.0	2.5	2.0	2.5	
60 Minute Throughput	3.6	Zero	Zero	Zero	
Gel at Room°	Nil	Nil+	Nil	Nil+	
Gel at 200°F.	Nil	Nil	Nil	Nil	
Gel at 250°F.	Nil	Nil	Nil	Nil	
Gel at 260°F.	Nil	Nil	Nil	Nil	

Form L-9 4M 3-39

In the United States Patent Office.

Delmar H. Larsen	Div. 64
Serial No. 531,494	Room No. 267
For: Employment of Non-Aqueous Well Drilling Fluids	Filed: April 17, 1944

Affidavit.

State of California }
County of Los Angeles } ss.

George L. Ratcliffe, being duly sworn, deposes and states as follows:

I am now and was prior to January 24, 1941, General Manager of Baroid Sales Division of National Lead Company, with headquarters at Los Angeles, California, the assignee of the above entitled application. In such capacity I am in supervision of the activities of the research laboratories, and in particular of Delmar H. Larsen, the applicant in the above entitled application.

I have read the affidavit of Delmar H. Larsen, submitted herewith, and state that to the best of my knowledge and belief the facts stated therein are true and correct. Prior to June of 1941, Delmar H. Larsen disclosed to me the invention of the use of gilsonite, grahamite, and manjak, or glance pitch, in oil base drilling muds. Some time prior to June of 1941 I received a copy of and read the laboratory report of George Miller, photostats of two pages, of which are attached to Mr. Larsen's affidavit.

I do not know and do not believe that the invention of the above entitled application has been in public use or on sale in this country, or patented or described in a printed publication in this or any foreign country for more than one year prior to this application, and that neither the

National Lead Company as Assignee nor the applicant has ever abandoned the invention.

George L. Ratcliffe.

Subscribed and sworn to before me this 1st day of March, 1945.

My commission expires July 27, 1948.

A. D. West,
(Seal) Notary Public in and for the County of
Los Angeles, State of California.

My Commission Expires July 27, 1948.

* * * * * * *

Supplemental Affidavit Under Rule 75.

State of California
County of Los Angeles } ss.

Delmar H. Larsen, being duly sworn, deposes and says that he is the applicant in the above-entitled application; he further deposes and says as follows supplementing his affidavit under Rule 75, dated March 1, 1945:

George Miller, the patentee of the Miller patents Nos. 2,316,967, 2,316,968 and 2,356,776, was before January 1, 1941, in the employ of Baroid Sales Division of the National Lead Company. Said Miller was so employed in the laboratory of that division in connection with tests on drilling fluids, including oil base drilling fluids. Said Miller was at that time and until after March 17, 1941, under the supervision of affiant, who directed said Miller's testing.

In the course of such employment applicant disclosed to said Miller drilling fluids containing natural asphalts of the type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite alone and in connection with suspending agents dispersible in oil and weighting materials dispersible in oil, and processes in the art of drilling wells by the employment of an oil base drilling fluid comprising adding such agents to such a drilling fluid. About March 1, 1941, applicant directed said Miller to conduct the tests noted on the data sheets filed with the affidavit of March 1, 1945, furnished the materials for such purpose as previously obtained, and instructed Miller how to conduct such tests. Such tests were made by said Miller as noted on said data sheets and said Miller reported the results to affiant. During said tests affiant not only had supervision of such tests, but was present in the same laboratory and observed such tests. Said Miller reported substantially every day to affiant the result of various tests conducted by him, including those enumerated in said data sheets. The final report as noted on said data sheets was made on March 17, 1941, by said Miller to affiant.

Affiant further states that the subject-matter of the claims now pending in the application was affiant's invention and that he does not know and does not believe that the invention has been in public use or on sale in this country, or patented or described in a printed publication in this or any foreign country for more than one year prior to this application, and that neither he nor his assignee has ever abandoned said invention.

Delmar H. Larsen.

Subscribed and sworn to before me this 15th day of January, 1947.

My Commission Expires Oct. 11, 1948.

J. H. Taggart,
(Seal) Notary Public in and for the County of
Los Angeles, State of California.

API RP 29
Third Edition
May, 1950

PL Ex 2

RECOMMENDED PRACTICE

for

STANDARD FIELD PROCEDURE FOR TESTING DRILLING FLUIDS

(Tentative)

AMERICAN PETROLEUM INSTITUTE
New York City

Issued by
AMERICAN PETROLEUM INSTITUTE
DIVISION OF PRODUCTION
Dallas, Texas

Price $1.00

Copyright 1942 and 1950 by American Petroleum Institute

FIG. 5
SHEAROMETER

SECTION IV

FILTRATION

40. Instruments. The filtration or wall-building property of mud is determined by means of a filter press consisting of a frame and mud cylinder assembly (see Fig. 6 and 7). The mud cylinder has an internal diameter of 3±0.07 in. and a height of at least 2½ in. Both cylinder and bottom cap should be constructed of brass or some other material not affected by strongly alkaline solutions. The top of the cell is fitted with a gasket and a machined cap having a small hole for admission of a pressure medium. The bottom of the cell is closed by a sheet of 9 cm. filter paper (Whatman No. 50 or equivalent grade), backed by a 60- to 80-mesh wire screen and a bottom cap with drain tube, and with necessary gaskets to provide an effective seal. The filtration area is 7 sq. in. Pressure is supplied by compressed air, nitrogen, or any other safe and adequate means of maintaining constant fluid pressure. Oxygen should not be used because of the danger of an explosion, if oil is present in the mud.

Procedure

41. Assemble the cell in the following sequence: bottom cap, gasket, screen, filter paper, gasket and cylinder. The assembly should be dry.

42. To conserve pressure medium, fill the cell with the mud to be tested to within ¼ in. of the top. Place the cell in the frame; put on the top cap, making sure the gasket is in place, and tighten the "T" screw to complete the assembly. Place a dry graduated cylinder under the delivery tube to receive the filtrate. Close the relief valve and apply a pressure of 100±5 psi. The test period begins at the time of application of pressure.

43. After 30 min., shut off the applied pressure and open the relief valve. Measure the volume of filtrate.

44. Report the volume of filtrate in cubic centimeters (to 0.1 cc.) as the filter loss at 100 psi. at the

average temperature of the mud during the test, in degrees Fahrenheit. If a time other than the standard 30-min. interval is used, the time in minutes must be specified.

45. Remove the cell from the frame (first making certain that the pressure has been relieved) and pour off the mud. Carefully separate the base plate from the cylinder and wash the filter cake on the paper with a gentle stream of water. Measure the thickness of the filter cake.

46. Report the thickness of the filter cake in thirty-seconds of an inch.

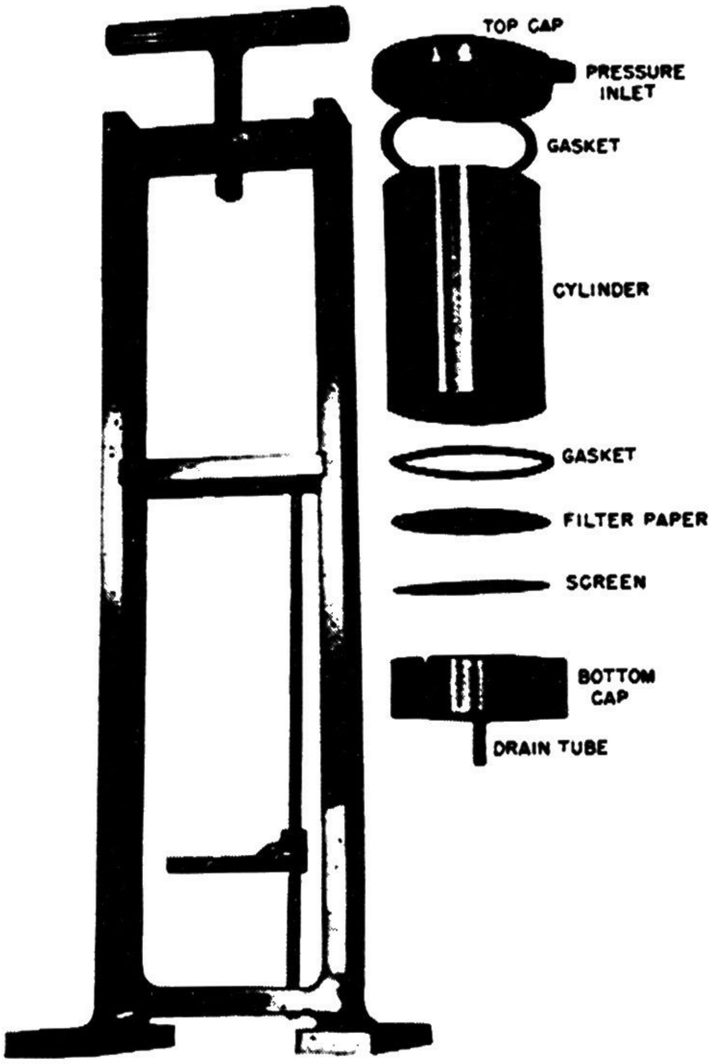


FIG. 6
FILTRATION EQUIPMENT

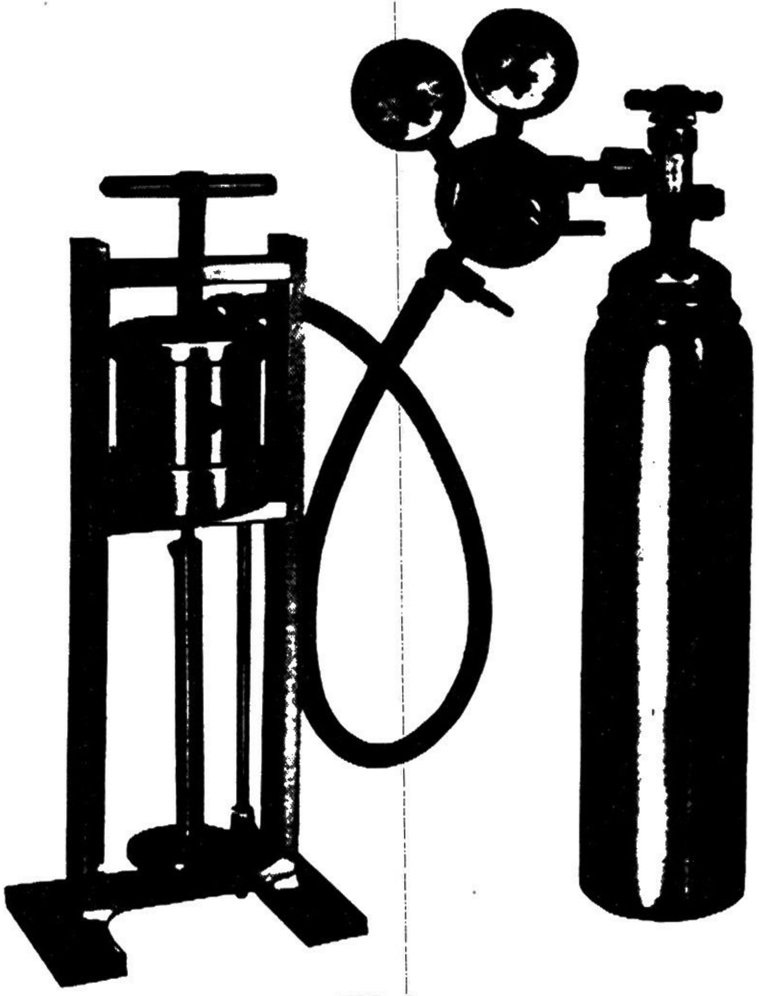


FIG. 7
FILTRATION EQUIPMENT

A Review of Recent Advances In Drilling-Mud Control

PL Ex 3

By PRESTON E. CHANEY, Sun Oil Company

A GENERAL review of the colloidal chemistry of clays and shales is presented as a theoretical background for the explanation of the various mud problems, and for the chemical treatments used in their correction.

Each of the common mud problems is discussed separately, and an attempt is made to provide a method of diagnosing the cause of trouble from changes in the physical properties of the mud. Following this diagnosis, one or more methods of treatment for correction of the trouble are described, and the theoretical explanation for the action of the corrective treatment is presented whenever possible.

A table showing the combinations of mud properties, or "symptoms" associated with each type of trouble, together with an outline of the corrective treatment, is presented as an aid in rapidly deciding upon the cause of trouble and in selecting the proper treatment.

This paper was presented before the Division of Production at the Twenty-third Annual Meeting of the American Petroleum Institute, Chicago, Ill., November 10, 1942.

IN RECENT years the technique of mud control has made rapid advances. The research engineers of the oil industry, of the universities, and of the commercial mud and chemical companies have sought and found explanations for many of the peculiarities of mud behavior. Consequently they are able to predict more accurately than before the response of mud to various treatments and, in many cases, to avoid trouble as well as to correct it.

Unfortunately, the field mud engineer often does not have the opportunity to study the literature and to perform the experiments necessary to a practical field application of these new discoveries. Consequently there is a gap between the research departments and field practice which delays the advance in field mud-control technique. To the practical mud engineer, the research man often seems too theoretical, and to the research man, the field engineer seems unwilling to accept new ideas. However, it is necessary to efficient operation that these groups cooperate.

In this paper an attempt is made to bridge this gap between laboratory and field practice. The ordinary mud troubles are considered, and an effort made to explain theoretically both the cause of the trouble and the effects of the corrective chemical treatment. The paper has been written primarily from a practical standpoint, and to the research engineer the theoretical phases probably will appear overly simplified. Most controversial points of theory have been omitted in order to avoid confusion, and only those theoretical explanations which, in the author's opinion, best seem to fit the facts are included. All methods of mud treatment suggested in the following pages have been used successfully and economically in the field.

It is realized in presenting this paper that criticism will come from both research and field engineers, for the reason that a compromise between the two points of view has been attempted. However, if the paper serves to draw these two groups nearer to mutual understanding, and to further the application of fundamental colloid chemistry in the analysis and treatment of field mud problems, it will have served its purpose.

Daily Field Tests on Drilling Mud

The following tests are essential to any proper estimation of mud condition. They should be conducted daily, or more often in case of trouble. A suitable form, or a place on the daily drilling report, should be provided for reporting the results of these daily tests:

1. *Weight* (pounds per gallon, pounds per cubic foot, or pounds per square inch per 100 feet of depth).
   (*Note:* Hydrometer or balance should be adjusted to the calibration mark with water at least once per day when weight is critical.)
2. *Viscosity* (Marsh-funnel) (in seconds).
   (*Note:* When commercial weighting materials are used, and in all deep drilling, weight and viscosity should be determined at frequent intervals.)
3. *Sand and total solids* (percent).
   (One sample from pump suction, and one from flow line.)
4. *pH.*
5. *30-min filter test:*
   a. Record milliliters of filtrate at end of 30 min.
   b. Record cake thickness (32nds of an inch).
6. *Salt*—reported as parts per million of chloride.
7. *Remarks:*
   In the daily report, under "remarks," record any mud properties such as high gel rate, gas bubbles, etc., which may be observed from the general appearance of the mud, but which are not indicated directly by the foregoing test results. Also note any tight sections in the hole or other drilling difficulties which might possibly be corrected by suitable adjustments of mud properties.

The American Petroleum Institute has recommended standard methods of conducting the foregoing tests, and detailed procedures may be found in their publication entitled *API Code No. 29: "Recommended Practice on Standard Field Procedure for Testing Drilling Fluids," second edition (1942).*

Inasmuch as such a large proportion of all mud troubles is of chemical origin, it is essential that the field engineer have a working knowledge of the chemistry of colloidal clays. The following discussion of colloidal-clay chemistry is presented only as a review or survey of the literature. For a more complete study of this subject, the reader is referred to the list of references at the end of this paper.

Hydration of Clay Colloids

Colloidal materials may be divided into two general types, according to their action when suspended in water:

The ***suspensoids, or hydrophobic colloids,*** have little affinity for water, and only form a stable suspension if the individual

PLAINTIFF'S EXHIBIT 4.

Baroid Sales Department.

National Pigments & Chemical Division of
National Lead Company,
837 Jackson Street,
Los Angeles, California.

Started: June 3, 1940.

April 16, 1940.

Mr. George Miller

Oil Base Drilling Mud

Dear Mr. Miller:

Confirming our conversation, we will be glad to enter into an agreement with you covering an exclusive license under a patent application which you intend to make covering the invention of an oil base drilling mud to be used in the drilling of oil wells.

Inasmuch as I am leaving town and it will be impossible to draw up and execute a final agreement before my departure, I am setting forth in this letter the terms and conditions which we have agreed upon and which will be incorporated in the final agreement when it is drawn up.

We will put you on the Company pay roll at a salary of $250.00 per month, effective April 15th, 1940, for a period of six months. During this period, you will perform whatever duties required of you by the Company, in the same manner as any other employee.

During the said six months period, we will investigate the possibility of obtaining a patent on your invention and the merit and commercial value of the invention itself. If at the end of the said six months we are not interested in going ahead with the proposition, the agreement which will have been drawn up by that time may be cancelled by us, and you will then be free to submit the invention to any other person or corporation; except, however, that we may extend the said six months period from month to month for an additional six months by continuing to keep you on the pay roll as an employee at the stipulated salary. At the end of any month, however, we may, upon thirty days' notice, discontinue your employment with the Company and cancel the agreement.

If at the end of said six months period or any extension thereof, as above provided, we shall decide to continue the agreement in force, we shall then be obligated to continue you on the pay roll at the stipulated salary or pay you a minimum royalty of $250.00 per month.

In the agreement which is to be drawn, we will agree to bear all expenses in connection with obtaining the said patent, which will be handled in the ordinary way by our patent attorney. You will agree to turn over to us all of the information necessary to make the patent application and to cooperate with us in every way possible in obtaining a patent.

You are to receive a royalty of 12½¢ per barrel on each and every barrel of the drilling fluid covered by your invention under your patent, on which we receive payment from any oil company or individual. In other words, if we sell the drilling mud as such, we will pay you 12½¢ for every barrel that we sell and receive payment for. If we license oil companies to use the material or process covered by your patent, we will pay you 12½¢ per barrel out of any royalties so received. We are to have the exclusive rights under the patent or patents which you obtain on the said drilling mud, and you agree to assign these patents or patent applications to us upon our request.

In the event that you elect to continue in your present employment, instead of employing you on the basis above outlined, we agree to pay you a lump sum of $1000.00 upon signing the agreement hereinabove mentioned. Also, it is understood and agreed that you are to receive a royalty on the sale of all materials sold by the Company (except such materials as may now be sold by the Company) which are used in connection with the said oil base drilling mud and which are covered by your patent. This royalty on such materials shall be based upon some mutually agreed upon rate which would result in your obtaining 12½¢ per barrel royalty if the said materials were sold as a part of a barrel of the said oil base drilling mud. It is understood that only one royalty shall be paid, that is, either the royalty on a barrel of oil base drilling mud if it is used as such, or a proportionate royalty on the materials entering into the composition of a barrel of the said oil base drilling mud, provided the said materials are sold separately by us.

If the above represents your understanding of our verbal agreement, kindly sign one copy of this letter, which is being written in duplicate, and return for our files, and oblige.

Yours very truly,

Baroid Sales Division,
Geo. L. Ratcliffe,
General Manager.

GLR:TB

Geo. Miller.

PLAINTIFF'S EXHIBIT 5.

January 15, 1941.

Mr. J. H. Bruninga,
1004 Market Street,
St. Louis, Missouri.

Dear Mr. Bruninga:

Mr. Lewis E. Lyon has drawn up the enclosed application for an Oil Base Drilling Fluid for Mr. George Miller. There is a possibility that I will be in St. Louis next week, and if it is agreeable with you perhaps we can look this over in detail.

There is also enclosed an additional patent which has issued to Shell Development Company, No. 2,220,681, Huisman, and which covers the addition of magnesium oxide to an oil base drilling fluid.

Very truly yours,

D. H. Larsen.

DHL:mg

Encs.

cc—G. L. R.

PLAINTIFF'S EXHIBIT 6.

I, George Miller, a citizen of the United States, residing at Los Angeles, in the County of Los Angeles, and State of California, have invented a new and useful

Oil Base Drilling Fluid

of which the following is a specification:

This invention relates to oil base drilling fluids for oil and gas wells. Oil base drilling fluids are generally utilized in the oil zone but may of course be used to combat hydrous disintegrating shales. The permeability of an oil sand is reduced appreciably where water, clay, muds or fluids are used as a result of watering-off, and it is for this reason that the so-called non-aqueous or oil base drilling fluids are utilized. Non-aqueous or oil base drilling fluids are utilized because they can not lose water into the oil sands. The properties of such an oil base or non-aqueous drilling fluid are that the viscosity must be within allowable limits, must possess good gel strength throughout the elevated temperatures encountered and must possess high plastering and deplastering properties and they must be capable of regeneration if they are to be susceptible of economic use.

Another object of this invention is to produce a non-aqueous drilling fluid of the type including an oil for fluidity, weighting material, material for producing the desired viscosity range, and a material hygroscopic in character which is not disadvantageously affected by heat and which will permit water contamination of the drilling fluid up to, or in the neighborhood of, 15% by volume.

Other objects and advantages of this invention it is believed will be apparent from the hereinafter set forth preferred embodiment of my invention.

I have discovered that a non-aqueous or oil base drilling fluid can be prepared which is self-regenerating and which may be easily regenerated and which will have all of the necessary properties of fluidity, weight, plastering and deplastering properties by forming such oil base drilling fluid using the ordinarily employed materials such as a satisfactory oil to produce the desired fluidity, an oil, ordinary weight material, a material such as air-blown asphalt to produce the required viscosity or the plastering properties and employing calcium oxide which will react with water to produce the required gel strength and plastering properties and wherein there is or may be an excess of calcium oxide present to provide for the self-regenerating properties for such drilling fluid.

I have further discovered that in place of calcium oxide other substances of a hygroscopic nature may be employed which have the properties of chemically combining with water to produce a material which has the required gel strength and which may or may not have the desired plastering properties. Among the materials which I have found which are suitable for this purpose are calcium oxide, strontium oxide and anhydrous copper sulphate. The chemical reactions, together with the atomic weights of these materials showing their chemical combinations with water and their ratio as to removal of water from such non-aqueous drilling fluids are:

	Ratio
(a) $\overset{56}{CaO} + \overset{18}{H_2O} - \overset{74}{Ca(OH)_2}$	3.11 to 1
(b) $\overset{40}{MgO} + \overset{18}{H_2O} - \overset{58}{Mg(OH)_2}$	2.22 to 1
(c) $\overset{88}{SrO} + \overset{18}{H_2O} - \overset{106}{Sr(OH)_2}$	4.89 to 1
(d) $\overset{159}{CuSO_4} + \overset{90}{5H_2O} - \overset{249}{CuSO_4}\ 5H_2O$	1.77 to 1

The foregoing examples are specifically given although there are undoubtedly other hygroscopic substances which remove water by chemical or physical reaction in such manner that the water is tenaciously held in the drilling fluid so that it is not taken from the drilling fluid into the oil sands.

A non-aqueous drilling fluid is utilized in the oil sands because it has been found that when an aqueous drilling fluid is utilized the water of such aqueous drilling fluid is given up to the oil sand with subsequent reduction of the permeability of the oil sand to as high a degree as 50% or more of the total permeability of such sand.

In the above set forth specific examples of my invention I have found that magnesium oxide and calcium oxide in addition to their providing a substance which will chemically combine with water to remove the water with which the non-aqueous drilling fluid soon becomes contaminated on drilling also have the property of producing a good gel required for the formation of a permanent drilling fluid where the weighting material will not separate therefrom.

In the case of strontium oxide and copper sulphate, there is no gel produced so that it would be necessary when utilizing these materials as dewatering agents for such an non-aqueous drilling fluid to employ a separate gel-producing agent.

As cost enters essentially into the use of a drilling fluid at the present time it is preferable to employ calcium oxide because it is the cheapest of the substances which may be satisfactorily employed. Magnesium oxide compares in price range with the price range of lamp black so that it could also be advantageously employed. The costs of the other oxides are such at the present time as to make their use less desirable—this is also true of copper sulphate.

It will be apparent from the foregoing ratio table as set forth in connection with the chemical reactions "a" to "d," inclusive, that the copper sulphate is most effective from a weight and ratio standpoint for the purpose of removing water and thereby regenerating the non-aqueous drilling fluid. It will be noted also that the strontium oxide is the least effective from this standpoint and is quite high in price so that under present conditions it would appear that this oxide is the least desirable. The difference in ratio between calcium oxide and magnesium oxide would show that the magnesium oxide is the most effective as regards regeneration of the non-aqueous drilling fluid, but this is more than offset by the difference in cost between these materials at the present time and also by the difference in weight effect of the calcium hydroxide as compared with the magnesium hydroxide. This is important in that such drilling fluids must or preferably do have a weight ranging from 68 to 80 lbs. per cubic foot.

Another very important requirement of a non-aqueous drilling fluid is that its gel strength or the gel strength of the material utilized be sufficient to maintain the requisite weight of the material and be of such character that the same is not decidedly weakened as higher temperatures are encountered. In this respect I have found that calcium oxide when utilized and calcium hydroxide as it is formed meet admirably the requirements in that calcium hydroxide when formed is not detrimentally affected by elevated temperature within the ranges encountered. As compared with the conventional lamp black, a non-aqueous drilling fluid as described in the recently issued Patents Nos. 2,222,949 and 2,223,027, granted November 26, 1940, the gel strength of the non-aqueous drilling fluid employing calcium oxide and calcium hydroxide was very good at temperatures up to and exceeding 200°F. and there was exhibited at these temperatures no bottom or top settling while in the case of the aforesaid lamp black non-aqueous drilling fluid of the same composition the gel strength was very materially reduced by such elevated temperature and there was evidence of settling of the weighting material from the fluid at the elevated temperature.

It has also been found by experiment that the non-aqueous drilling fluids produced in accordance with my invention employing the substances which I have herein set forth as of a hygroscopic nature of calcium oxide are not affected by water contamination. The calcium hydroxide drilling fluid has been shown to be unaffected by temperature up to 260°F. or water contamination up to 11.1% by volume and in some tests it has been shown that there is no harmful effect noticeable upon the calcium hydroxide drilling fluids by contamination with water up to 15% or slightly greater quantities of water compared with the fluid itelf.

The plastering and deplastering properties of the non-aqueous drilling fluid of my invention are of course supplied by the blown asphalt and the combined effects of the blown asphalt and the calcium hydroxide when and as this material is formed.

It has previously been shown by experimental evidence and field experience that increase of the water content of the non-aqueous drilling fluid has little, if any, effect upon these properties.

In order to make the drilling fluid embodying my invention self-regenerating, it is only necessary to add to the drilling fluid an excess of calcium oxide over that required for the production of the requisite calcium hydroxide required for producing the necessary gel. This excess of calcium oxide merely acts then as an additional weighting material and being of a weight closely approximating that desired for the drilling fluid, it has no material effect upon the ultimate weight of the mud. By using such an excess it will be apparent that as additional water is taken up by the drilling fluid from the surroundings or from the drill hole, or from the oil sand, that this water acts with the calcium hydroxide producing a further quantity of gel material and not in any way to detrimentally affect the drilling fluid itself, but to retain the water therein in such manner that it does not affect the permeability of the oil sands.

It will also be apparent that after the gel has apparently been spent, that is, has taken up water to such an extent that it does not self-regenerate, that the drilling fluid may be easily regenerated by merely adding thereto the quantity of calcium oxide required in order to take up the water and to then add, if desired, further quantities of blown asphalt, weighting material and oil as may be required. Any type of oil such as that which is commonly described as "stove oil" or "gas oil" may be utilized in preparing the non-aqueous drilling fluids in exactly the same manner as is used in preparing other types of drilling fluids. Any suitable or desirable character of weighting material may also be employed and one material which is extremely susceptible for use in this type or these types of drilling fluid is ground oyster shells, although it is obvious that any suitable or desirable form of weighting material may be utilized.

Any suitable or any desirable material having plastering or deplastering properties may also be utilized and while I have herein set forth that blown asphalt may be utilized, it is obvious that my invention is in no way limited to the use of this material as a plastering or deplastering agent.

It is also obvious that any type of gel material may be added to, or used in, conjunction with my invention.

As a preferred example of the manner in which materials may be compounded to produce a non-aqueous drilling fluid embodying my invention, the following specific example is given merely, however, as illustrative and not intended to limit in any way my invention to the specific proportions or quantities or ingredients as therein set forth. Such an example of the non-aqueous drilling fluid embodying my invention is:

% by Wt.	Material	
50 %	Stove Oil or Gas Oil	
33 %	Calcium Carbonate or Oyster Shell Lime	
13 %	Blown Asphalt or Mineral Rubber	
3.02%	Water)	—4% By Wt. Calcium Hydroxide
0.98%	Calcium Oxide)	
100.00%		

I claim:

1. A non-aqueous drilling fluid comprising oil, a weighting material, a plastering material and calcium hydroxide.

2. A non-aqueous drilling fluid comprising an oil, a weighting material, a plastering material, and an excess of calcium oxide.

3. A self-regenerating non-aqueous drilling fluid comprising an oil, finely divided solid material, blown asphalt, and an excess of calcium oxide.

4. A non-aqueous drilling fluid comprising oil, a finely divided weighting material, calcium hydroxide as a settling inhibitor, and blown asphalt.

5. A non-aqueous drilling fluid comprising an oil, a weighting material, a plastering material, and a hygroscopic substance of the character of calcium oxide, magnesium oxide, strontium oxide, and anhydrous copper sulphate.

PLAINTFFS
EXHIBIT 7

PRIMERS, **(continued)**

For roads, walks, drives, earth reservoirs,

Recommended Asphalt—Emulsified Asphalt or MC-1 Cutback.

In general, MC-1 cutback is suitable as a primer for earth over which other asphaltic applications are to be made. The primer should be allowed to penetrate until there is no liquid on the surface and the earth should then be rolled before the primer takes its final "set."

RESERVOIRS

Concrete, sealing cracks in,
See "Cracks, filling of." (page 18)

Earth,
See "Dams" (page 18)

REVETMENTS

Recommended Asphalt—Cyclopean Asphalt.
See "Dams." (page 18)

ROADS, **construction of,**

See pages 24-41. For various types of road construction, see index.

ROOFING,

Built-up new, or Built-up old, or Repairing

See also "Patching." (page 21)

Built-up roofs are constructed by applying over the sheathing a hot mop of asphalt, then a layer of roofing felt, a second layer of asphalt, a second layer of felt and a third layer of asphalt. Heavier roofs may be constructed by repetition of the foregoing. For level or nearly level roofs in ordinary climates, Unolox 2A is recommended. For steeply sloping roofs or very hot climates, Unolox 1C is preferable on account of its higher softening point.

In all roof treatments it should be borne in mind that sunlight causes any asphaltic material to deteriorate in time. Consequently, first grade roll roofings are slate coated to prevent the sunlight from striking the asphalt and slate is also used in making asphalt shingles for the same reason. Therefore, it is nearly always desirable to protect asphalt roofs with a material through which light cannot pass. This is often done by covering the last coat of asphalt with warm pea gravel, crushed brick or sand. In applying such mineral covering, care should be taken that the mineral is only hot enough to bond well to the asphalt but not hot enough to melt its way clear through the asphalt.

RUBBER,

Hard, compounding of,

Recommended Asphalt—Special Oxidized 190 M.P.

Asphalt is used in the manufacture of hard rubber articles such as storage battery cases. For this purpose Special Oxidized 190 M.P. asphalt has been found entirely satisfactory.

RUBBER, (continued)

Tires, and soft rubber in general,
Recommended Asphalt—Union Mineral Rubber

Large quantities of hard air blown asphalt known as mineral rubber are consumed annually in compounding rubber for tires and the like. The asphalt serves to color the rubber and at the same time increases its toughness.

Flux for,

Various grades of asphalt are available as a flux for reclaiming and compounding rubber. Details may be obtained upon application.

SEA WALLS, Storm-proofing and revetting,

Recommended Asphalt—Cyclopean Asphalt.

A mastic, applied hot, and consisting of crushed stone, sand and Union Cyclopean Asphalt, has proved effective in preventing the wave action of storms from displacing the heavy stone used as facing for sea walls. Details may be obtained upon application.

STORAGE BATTERIES, Sealing of,

Recommended Asphalt—Union Battery Sealing Compound.
See "Batteries." (page 15)

TROUGHS, Sealing

See "Flumes." (page 20)

WALKS,

See "Roads" and "Drives." (page 26)

WATERPROOFING

Steel	See "Corrosion prevention" (pages 16-18)
Roofs	See "Patching" (page 21)
Concrete	See "Floors" (page 19)
Parapets and Walls	For treating parapets around roofs and the like, Union emulsified asphalt, grade 55-P-E, may be applied with a brush or better, with a hand spray.

PLAINTIFF'S EXHIBIT 8.

Oil Base Drilling Fluids of Low Specific Gravity.

(Supplemental Report.)

A patent has been granted to the Shell Oil Company, No. 2,223,027, which tends to monopolize the use of blown asphalt in oil base drilling fluids. This patent pertains to the one fact that if an asphaltic bitumen is blown or oxidized it will impart better plastering properties to an oil base drilling fluid than if the same asphaltic bitumen is used and has been steam refined instead of air blown. The whole patent stresses the one point of plastering property aid, whereas that is only a small portion of the blown asphalt's function. Blown asphalts that aid plastering properties do not necessarily provide gel strength properties at high temperatures and also some blown asphalts impart excessive gel strengths and poor plastering. It is conceded that with a given asphaltic residuum the fact that it has been blown or oxidized will improve the plastering properties to some extent, but in either case, blown or non-blown, the plastering properties may be what is termed unsatisfactory as far as its use in an oil base drilling fluid is concerned.

If a blown asphalt is used which has excellent plastering properties and little or no gel properties at high temperatures it is as useless as a steam refined asphalt which has good gel properties and poor plastering properties. Thus it is seen that the two main functions of a blown asphalt used in an oil base drilling fluid are to impart good plastering properties and good gel properties. If it can be shown how to manufacture a blown asphalt which has both of the essential properties instead of only one, this should be a decided improvement over the above mentioned patent. It will be shown later that it is impractical to attempt to increase the gelling properties of a blown asphaltic bitumen, which may have good plastering properties and poor gelling properties, by the addition of settling inhibitors such as voluminous magnesium oxide, or carbonate, magnesium hydroxide, calcium hydroxide, lampblack, etc. This is due to the fact that if the blown bitumen is weak in gel properties, such a quantity of settling inhibitor must be added in order to stabilize the drilling fluid at high temperatures that the gel strength and viscosity of the resulting oil base mud is too great for practical use at lower or normal temperatures. Also some of the above mentioned settling inhibitors when added in this quantity tend to impair the plastering and deplastering properties of the mud which is vital to its practicability.

Theory.

Asphalts are colloidal systems of which the most important constituents are petrolenes and asphaltenes. The petrolenes consist of the so-called asphaltic resins and oily constituents, and are soluble in low-boiling petrol. According to Nellensteyn the asphaltenes are made up of particles of elementary carbon which have absorbed some of the asphaltic resins and are thus kept dispersed in the oily medium. Not all investigators seem to agree that the asphaltenes consist of elementary carbon. Pfeiffer and Van Doormaal, for example, consider the asphaltenes to be hydrocarbons of high molecular weight, chiefly aromatic or hydro-aromatic in nature. They are assumed to have a low hydrogen content, and to be formed during the distillation process by poly-merization and dehydrogenation. In form the asphaltenes are thought to be globular or globularly coiled systems with short side chains at certain spots. At low temperatures they will form gels with the oil constitutents. They are thus supposed in this gel state with globular miscelles to exhibit a certain analogy with a non-hardening resin. According to Mack the asphaltenes are assumed to be dispersed in the asphaltic resins, and sometimes in the oily constituents as well. In the latter case the "liquid" part will therefore be very viscous and will behave physically as if it were the liquid part of an isogel. Oily constituents rich in sulphur or aromatic in character should be solvents for the asphaltenes, the other oily constituents should be non-solvents. According to Mack it is chiefly the behavior of these petrolenes acting as a solvent for the asphaltenes which determines the elastic and plastic properties of the asphalt. Pfeiffer and Van Doormaal go somewhat farther, and postulate that the aromatic or hydro-aromatic surface of the asphaltene miscelles will make them peptize best in aromatic or hydro-aromatic petrolenes. When the latter are removed from the bitumen, for instance by blowing—leading to the so-called blown asphalts, in contrast to the steam-refined asphalts—there will no longer be complete peptization of the asphaltenes. These will then adhere to each other in a flocculated condition, so that their free motion is impeded. A purely viscous flow will then no longer be possible. This is considered to be the cause of the great difference in rheological properties between the blown and the steam refined asphalts. One may thus deduce from these considerations that it is chiefly the character and the content of the petrolenes which are important for the properties of an asphalt.

Blown asphalts consist of oily constituents, resins, and asphaltenes. The asphaltenes when of the proper colloidal particle size, impart the plastering properties. The resins, or combination of resins, oil, and asphaltenes, imparts the gel strength which is of equal importance in regard to plastering properties. If a given stock or residuum is blown long enough, the asphalt will change to coke which possesses neither property. This is apparently due to the fact that as an asphaltic residuum is blown or oxidized, the asphaltene content increases in quantity and also the asphaltenes increase in size. During the blowing process the petrolenes tend to be removed or absorbed partly by the asphaltenes which tends to decrease the penetration and make the product harder. Thus as the molecular or particle size of the asphaltenes increase beyond the collodial size, the plastering properties decrease. In the very early blowing stage the asphaltenes are either too few or too small to impart these desirable plastering properties. Various asphalts possess different properties, due chiefly to the petrolene type or quality and these petrolenes more or less limit the specifications to which the residuum may be blown or oxidized.

It is known that most any asphalt which has been blown or oxidized will have superior plastering properties to the same asphalt which has been steam refined. However, the assumption that the further the residuum is oxidized, or the blowing process continued, the better the plastering properties, seems erroneous because experiments (see data Sheet No. 1) show that definite limits are involved where the plastering properties are at a maximum. The penetration or hardness or elasticity of a blown asphalt is chiefly due to the status of the petrolenes which in turn limit the gel strength imparted. Thus it follows that in order to obtain the maximum plastering properties and desired gel strength from a certain blown asphalt, the blowing process must be continued until a certain definite range is reached and no further.

To repeat—a blown bitumen which will plaster, but does not provide a suitable gel strength, is as valueless as a bitumen which provides suitable gel strength, but unsuitable plastering properties. These two properties, gel strength, and plastering, must go hand in hand to attain the ultimate or desired asphaltic bitumen required for an oil base drilling fluid. It has been proven by experiment in the laboratory that to try to provide proper gel properties to an oil base drilling fluid which contains blown asphalt of the type that has excellent plastering properties but poor gel strength at high temperatures, by auxiliary addition of gel materials such as lampblack, calcium hydroxide, voluminous magnesium oxide, carbonate, or magnesium hydroxide, is futile. With increased addition of lampblack the deplastering properties are impaired. With increased addition of voluminous magnesium oxide or magnesium hydroxide the plastering properties are impaired (see page 16 of Report No. 1). In any event if a large enough quantity of settling inhibitor or gel agent is added so that the required or desired high temperature gel strength of the drilling fluid is attained, then the gel strength at normal temperatures will be so great as to make the drilling mud impractical to use in the field.

It has been found in the laboratory that if an air blown asphalt is heated above its melting point during the cutting back process, the gel strength of the resulting cutback asphalt is impaired. Thus a desired oil base drilling fluid containing blown asphalt should never be subjected to heat above the melting point of the asphalt used. Since bottom hole temperatures of 240° F. have been reported, the best asphalt should have a melting point of at least 260° F. in order to make a universal drilling fluid.

An article appeared in the May, 1940, issue of Petroleum regarding the blowing of bitumen. A curve was given which shows the difference in melting point and penetration between a bitumen blown in the conventional way and the same one blown under pressure (see curve sheet). These curves have been plotted and all the asphalts tested along with all the asphalts named in U. S. Patent No. 2,223,027, plotted. From laboratory tests of eight different asphalts it was found that the blown asphalts located below the pressure curve tended to be weak in gel strength at high temperatures. The Y-20 blown asphalt which has a melting point of 232° F. and a penetration of 16 was satisfactory when lampblack was used, only to a temperature of 160° F. When a better gel material was used such as $Ca(OH)_2$ the gel strength was satisfactory to a temperature of 200° F. None of the Flinkote asphalts or the Shell Y-20 asphalt was found satisfactory for temperatures over 200° F., although they all possessed excellent plastering properties (see Data Sheet No. 2).

Union Oil Company manufactures a blown asphalt which is sold under the trade name of Mineral Rubber. The stock specifications as ordered by the Firestone Rubber Company demand a melting point of 303° F. and a penetration of 7. This type of blown asphalt was found to have too high a gel strength and slightly inferior plastering properties (see Data Sheet No. 1). However, by experimentation it was found that the same asphaltic bitumen when blown to a M. P. of 270° F. and a Pen. of 10 was very satisfactory in regard to plastering and gel strength. Thus it was found by increasing the penetration and lowering the melting point, the plastering was not only improved but the gel strength was reduced to a satisfactory point also.

Very few California asphaltic residuums can be blown to a relatively high melting point (260°-280° F.) with a satisfactory penetration (9-11) by ordinary methods. This is undoubtedly due to the type of petrolenes in the particular residuum. Thus to produce the desired type of blown asphalt for a universal drilling fluid (M. P. 260-300° F., Pen. 7-14), one which will give excellent plastering properties and practical gel strengths for temperatures up to 260° F., the correct stock must be selected, and in cases of slightly inferior stocks, pressure blowing should be used.

Another interesting point pertaining to the correct type of blown asphalt is that if the bitumen could be blown to a point where the penetration was sufficiently low so that an additional settling inhibitor was unnecessary, then the plastering properties are inferior, which, as explained before, is thought to be due to the status of the asphaltenes. Also (see Data Sheet No. 3) a bitumen which has been blown to the correct range for high temperature performance is entirely unsatisfactory if an additional settling inhibitor is not added. Thus it is seen that not only must the correct specified asphalt be used, but the right type and quantity of additional gelling agent must be used in combination with this blown asphalt.

Lastly, unless the correct type of oil is used as a suspending medium for the blown asphalt, gel agent, and weight material, the properties of the drilling mud formed will be inferior or of an impractical nature (see Data Sheet No. 4). A satisfactory oil for the universal drilling fluid must be of fairly high gravity and relatively free of aromatics and other constituents which tend to not only change the relationship between the petrolenes and asphaltenes, but to dissolve the asphaltenes. Thus it can be seen that the wrong type of oil will completely ruin the structure of the asphaltic bitumen and thus ruin the properties of the drilling fluid. As has been found (see Data Sheet No. 4), a good, refined, absorption oil, dieseline oil, or stove oil, is very satisfactory, whereas a poorly refined distillate, diesel fuel, etc., is impractical even though it may be of the correct gravity range to otherwise aid the viscosity properties of the oil base drilling fluid.

CONCLUSIONS.

1. The correct type of asphaltic bitumen should be used which will not only impart plastering properties, but also gel strength, when exposed to high temperatures.

2. The allowable range for this blown asphalt should be, melting point 260°-300° F., penetration 7-14 mm. at 25° C.

3. The correct type of additional gelling agent should be used such as calcium oxide or calcium hydroxide.

4. The correct type of oil for the suspending medium should be used, such as a refined absorption oil, dieseline oil, stove oil, or oil relatively free from aromatics or constituents which tend to harm the properties of the blown asphalt.

5. If these specifications are followed an oil base drilling fluid can be made which is vastly superior to any other patented drilling fluid now in use.

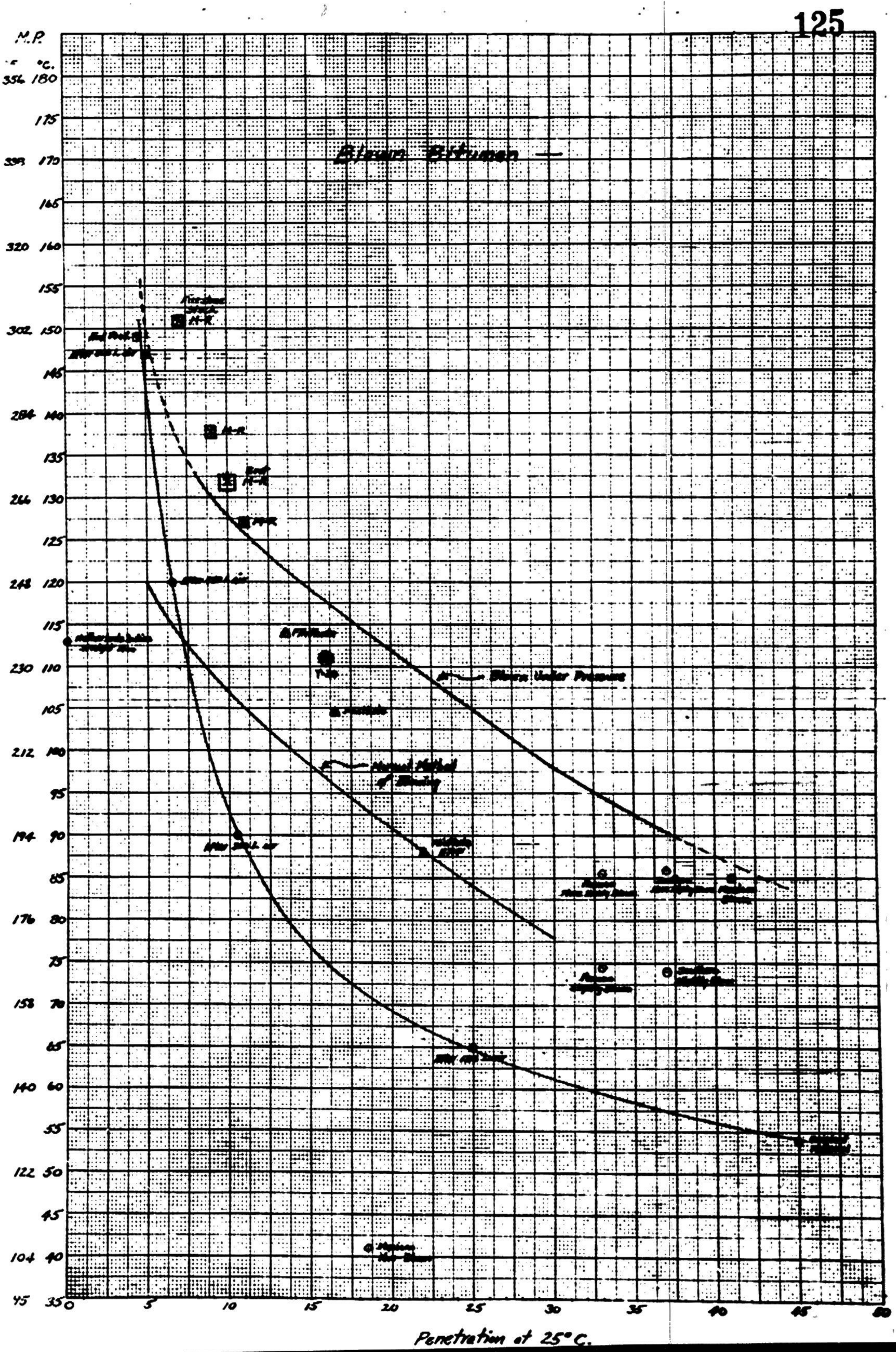
In a broad sense most any mixture of oil and other material may be classified as an oil base drilling fluid, but unless this drilling fluid has the correct properties, its use is more harmful than beneficial. Thus to further the science of oil base drilling fluids and to approach the perfect, it is necessary to consider all of the desired properties and not just one. Thus if one oil base drilling fluid will provide certain characteristics and another oil base drilling fluid will provide all of these characteristics plus other desired characteristics, this latter type of drilling fluid is a definite improvement.

Geo. Miller.

Subscribed and sworn to before me this 31st day of Jan., 1941, Al. West, Notary Public in and for the County of Los Angeles, State of California.

My Commission Expires July 27, 1944.

(Seal)


Blown Bitumen —
M.P.
°F °C.
356 180
175
338 170
165
320 160
155
302 150
145
284 140
135
266 130
125
248 120
115
230 110
105
212 100
95
194 90
85
176 80
75
158 70
65
140 60
55
122 50
45
104 40
45 35
0
5
10
15
20
25
30
35
40
45
50
Penetration at 25° C.
M-R
M-R
M-R
M-R
Blown Under Pressure
Normal Method of Blowing

Test No. **S. T.**

Sheet No. 1

Laboratory

DATA SHEET

EFFECT OF VARIOUS MINERAL RUBBERS

MATERIALS	%	%	%	%	%	%	%	%	%	%
$Ca(OH)_2$	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	4.0
SHELL STOVE OIL	50.0	52.0	50.0	50.0						50.0
UNION STOVE OIL					50.0	50.0	50.0	50.0	50.0	
GROUND OYSTER SHELLS	31.0	34.0	34.0	31.0	34.0	34.0	33.0	33.0		34.0
U. S. $CaCO_3$									33.0	
M-R 303°-7	14.0	10.0	12.0							
M-R 260°-11				14.0	12.0					
M-R 280°-9						12.0	14.0	13.0		
M-R 270°-10									13.0	
BLEND										
50% Y-20 AND										
50% M-R 303°-7										12.0
60 MINUTE THROUGHPUT	1.2	1.5	1.5	ZERO	1.0	1.0	0.2	ZERO	ZERO	0.2
GEL AT ROOM°	V.V.G.	V.G.	V.G.	V.V.G.	* V.G.	** V.G.	V.G.	V.G.	V.G.	V.G.
GEL AT 200°F.	V.G.	V.G.	V.G.	G+	G.	G.	G.	G+	G.	G.
GEL AT 250°F.			G+	G.	G.	G.	G.	G.	G.	FAIR +
GEL AT 260°F.							G−	G.	G.	

** THIS COLUMN IS SLIGHTLY BETTER THAN COLUMN *.

V.V.G. – VERY, VERY GOOD. V. G. – VERY GOOD. G. – GOOD.

FORM L-9 4M 3-39

Test No. **S. T.**

Sheet No. 2

Laboratory

DATA SHEET

EFFECT OF VARIOUS BLOWN ASPHALTS

MATERIALS	%	%	%	%	%	%
$Ca(OH)_2$	5.0	5.0	5.0	9.55	5.0	4.0
Shell Stove Oil	50.0	50.0	50.0	47.60	50.0	50.0
Ground Oyster Shells	31.0	31.0	31.0	29.50	31.0	33.0
Y-20	14.0					
Flintkote 220°-16.5		14.0				
Flintkote 237°-13.5			14.0	13.34		
M-R 303°-7					14.0	
M-R 270°-10						13.0
60 Minute Throughput	Zero	Zero		Zero	1.2	Zero
Gel at Room°	G.	V.G.	Poor	V.V.G.	V.V.G.	V.G.
Gel at 200°F.	Fair	Nil+		Poor	V.G.	G.
Gel at 250°F.						G.
Gel at 260°F.						G.

Test No. S. T.

Sheet No. 3

Laboratory

DATA SHEET

EFFECT OF GEL MATERIAL (ABSENT)

MATERIALS	%	%	%
CA(OH)$_2$	NONE	NONE	NONE
SHELL STOVE OIL	52.7	51.5	52.7
GROUND OYSTER SHELLS	32.6	34.0	32.6
M-R 303^{0}-7	14.7		
M-R 280^{0}-9		14.42	
Y-20			14.7
60 MINUTE THROUGHPUT	ZERO	ZERO	ZERO
GEL AT ROOM^{0}	V.G.	V.G.	G.
GEL AT 200^{0}F.	FAIR	FAIR	NIL
GEL AT 250^{0}F.		NIL	
GEL AT 260^{0}F.		NIL	

Test No. **S. T.**

Sheet No. 4

Laboratory

DATA SHEET

EFFECT OF VARIOUS OILS MATERIALS	%	%	%	%	%	%	%	%		
$Ca(OH)_2$	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
Ground Oyster Shells	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0		
Y-20	14.0	14.0	14.0	14.0	14.0	14.0				
Shell Stove Oil	50.0						50.0			
Texaco Diesel Chief		50.0								
Golden Bear K-D			50.0							
El Tejon K-D				50.0						
Golden Bear Diesel Fuel					50.0					
El Tejon Diesel Fuel						50.0				
Union Stove Oil								50.0		
M-R 260°-11							14.0	14.0		
60 Minute Throughput	Zero	Zero	Zero	Zero			Zero	2D.		
Gel at Room°	G.	G+	V.G.	V.G.	V.Poor	V.P.	V.V.G.	V.G.		
Gel at 200°F.	Fair	G.	Nil+	Nil+			G+	G.		
Gel at 250°F.							G.	G.		
Gel at 260°F.										

PLAINTIFF'S EXHIBIT 9.

Los Angeles Tulsa Houston

Baroid Sales Division
National Lead Company

To: Mr. George L. Ratcliffe Date: February 13, 1941

From: Geo. Miller Office: Los Angeles

Subject: Oil Base Drilling Fluid Patents.

Dear Mr. Ratcliffe:

I had a talk last night with Mr. Caughey of Lyon & Lyon, regarding the oil base drilling fluid patent situation. He is reasonably positive that we can obtain an improvement patent on blown asphalt, in addition to our patent on regeneration. This blown asphalt patent, however, will probably infringe the Shell patent, but even so, should place us in a better position to make a reasonable deal with the Shell Oil Company. Should we rely solely upon the Shell patent for protection, and a third party patents the improvement, as is apparently possible, then a block would be placed upon both Shell and Baroid.

Mr. Caughey also pointed out that several of the claims on the Shell patent, No. 2,223,027, could be broken, and, if necessary, perhaps the whole patent, as there is possibly insufficient disclosure for such a broad claim.

Yours very truly,
Geo. Miller

GM:mb

C/Htn

DHL

PLAINTIFF'S EXHIBIT 10.

Mr. George Miller February 19, 1941

Geo. L. Ratcliffe Houston

Dear Mr. Miller:

With reference to your letter of February 13th, it would probably be a good idea to apply for a patent covering your improvement on blown asphalt.

With reference to the Shell Patent No. 2,223,027, I don't think we would ever be interested in trying to break any of the claims of this patent, but this information will available when and if we deal with the Shell Company for a license under this patent.

Yours very truly,

General Manager

GLR:TB

C/Htn

DHL

PLAINTIFF'S EXHIBIT 11.

Los Angeles Tulsa Houston

Baroid Sales Division
National Lead Company
Telephone Michigan 1381
830 Ducommun Street—Los Angeles, California

February 19, 1941

Mr. J. H. Bruninga
1004 Market Street
St. Louis, Missouri

Baroid Disclosure File—Gilsonite, Grahamite, and Manjak in Oil Base Drilling Fluids

Dear Mr. Bruninga:

This letter is written to disclose to you three new ingredients for oil base drilling muds, which should operate in the same manner as blows asphalts, as disclosed in Dawson, et al. Patent No. 2,223,027, to impart plastering properties and also to some extent gel properties to oil base drilling fluids. It is expected that laboratory work will demonstrate that selected grades of these three materials will be commercially practicable ingredients for this use.

According to this invention a natural asphalt rock chosen from the group comprising gilsonite, grahamite, and manjak is added to crude oil, with or without such other ingredients as calcium hydroxide, barytes, galena and the like, in such concentrations as experiment shows necessary to give desirable plastering and gel properties. Gilsonite is a natural bituminous substance found in the Uintah Valley in Utah; grahamite is a similar material found in several localities in the United States, Cuba, and South America; manjak, often called "Glance Pitch," is a similar material intermediate in properties between gilsonite and grahamite, found in the Barbadoes, in Colombia, and in Cuba. Most grahamites and manjaks, as well as the "standard" varieties of gilsonite, will "liver," i. e., form clabbery gels, in petroleum naphtha, although they are completely soluble in calcium disulphide. It is to be expected that the varieties which "liver" most will be found to give the best plastering and gel properties when used in oil base drilling fluids.

Samples of these three substances will be ordered and tested as soon as they arrive and the results reported. The undersigned is to be identified as the inventor.

Very truly yours,
D. H. Larsen

DHL:mg

cc—GLR

PLAINTIFF'S EXHIBIT 12.

March 5th, 1941

Mr. George L. Ratcliffe
Baroid Sales Division
830 Ducommun Street
Los Angeles, California

Baroid Disclosure File—Gilsonite, Grahamite and Manjak in Oil Base Drilling Fluids.

Dear George:

I am in receipt of Larsen's letter of February 19th, 1941, with reference to the above. In addition to the Dawson et al patent No. 2,9223,027, there is also a Swan patent which we purchased a number of years ago and which covers the employment of asphalt as a drilling fluid.

Very truly yours,

J. H. Bruninga

l-mh

cc—Mr. Ratcliffe at Houston

PLAINTIFF'S EXHIBIT 13.

Oil Base Drilling Fluids of Low Specific Gravity.

(Report No. 3.)

By Geo. Miller.

For the past two years considerable research work has been carried out by the major oil companies in an effort to discover materials which would lend suitable properties to oil base drilling fluids. Hundreds of materials have been tested; a few of which include, lampblacks, carbon blacks, calcene, diatomaceous earth, bentonite, talc, fluffy magnesium oxide and carbonate, furfural extract bottoms, duo sol extract bottoms, coal tars, road oils, potassium napthenate, biotite, mica, asbestine, powdered aluminum, various soaps, dubbs residues, selectively oil-wet materials, various weighting materials, and oils. Due to the unique properties desired, the search could be carried on almost indefinitely. However, it is obvious that from the standpoint of cost or practicability, a definite minimum price per barrel of oil base drilling fluid can be established due to the fact that an oil base mud must contain approximately 45% or more oil. To attempt to monopolize the oil base drilling fluid market by patents covering every possible useful material would not only take years of research, but would actually be futile due to constant discovery of synthetics and new chemical processes. Thus it seems that the only answer is to create an oil base drilling fluid which has the required properties and which approaches the minimum cost per barrel figure.

In an effort to find a substitute for air blown asphalt numerous materials were obtained and tested. Natural asphalts, gilsonite, glance pitch, one sample of grahamite, and Trinidad Lake asphalt, were found to possess very good plastering properties—even better than the blown asphalts listed in Shell Patent No. 2,223,027. However, the gel properties, as in the case of ordinary blown asphalts, were entirely unsatisfactory.

Gilsonite and glance pitch tend to melt upon heating whereas most varieties of grahamite tend to intumesce. Gilsonite tends to have better gel properties than glance pitch and is much lower in cost. The standard or "seconds" classification of gilsonite have higher melting points than the "select" grade and tend to gel in oil. From Data Sheet No. 1 it is seen that the higher the melting point of the gilsonite, the better the gel strength. However it is almost impossible to obtain a gilsonite in commercial quantities with a melting point much higher than 380° F. Also when attempting to cut-back an asphalt with a melting point much higher than 400° F., the stove oil tends to vaporize and distill off with too great a loss. Assuming that a grade of gilsonite could be obtained which would have a high enough melting point to give sufficient thixotropy, and means devised to cut it back with a fairly high gravity oil, such as stove oil, the cost per barrel of oil base drilling fluid would be increased by $0.44 to $1.22 more than if blown asphalt of the "mineral rubber" type were used.

Referring again to Data Sheet No. 1, it is also seen that none of the gilsonites tested gave sufficient gel strength even at room temperature and by increasing the gel material ($Ca(OH)_2$) to as high as 20%, the resulting gel strength was still very unsatisfactory. If 20% $Ca(OH)_2$ were used and the same amount of blown asphalt of the correct type (Report No. 2), instead of gilsonite, the resulting mixture would be almost solid. In general, the higher the melting point of the gilsonite, the better the gel strength, and the greater the viscosity of the mud at room temperature.

Trinidad Lake asphalt was tested (Data Sheet No. 2) and found to give fairly good plastering properties but no gel strength. This asphalt contains 28 to 32% ash which may account for the poorer plastering than the other native asphalts. Two samples of glance pitch and one sample of grahamite were tested (Data Sheet No. 2) and found to give excellent plastering but practically no gel strength. Samples of albertite, wurtzilite, and a different sample of grahamite than previously mentioned, were heated to over 700° F. and found to intumesce and would not cut-back with stove oil. A sample of asphaltum from Ventura County was obtained but it would not dissolve in OS_2 or oil and thus was automatically eliminated.

Two different samples of steam-refined asphalt were tested (Data Sheet No. 3) and found to lend practically no gel strength and bad plastering properties. The plastering properties were quite a bit better, however, than if no asphalt at all had been used. Both the black and green types of Ozocerite Wax were tested and found to give bad plastering properties but good gel strength at room temperature. This gel strength, however, practically disappeared at 100° F. A combination of gum rosin and $Ca(OH)_2$ was found to have good plastering properties but the viscosity and gel strength was too great at normal temperatures. When the viscosity of the gum rosin mud was lowered at normal temperatures the plastering became very bad. Gum rosin without $Ca(OH)_2$ provided neither gel nor plastering. Venice turpentine was found to lend good plastering properties and a very high viscosity at room temperature, but practically no gel strength. A sample of coal tar pitch was melted and cut-back in stove oil but upon cooling tended to settle out solid, thus eliminating its use.

Some months ago hydrogenated castor oil was tested and found to lend poor plastering properties but a very very strong gel strength at room temperature which practically disappeared at slightly higher temperatures. When used in conjunction with "mineral rubber" blown asphalt, stove oil, and a weight material, the hydrogenated castor oil was found to lend a very stiff gel at room temperature, but the gel strength of the mixture practically disappeared at 200° F. The hydrogenated castor oil did not aid or impair the plastering properties of the blown asphalt.

A selectively oil wet bentonite was found to provide satisfactory viscosity and gel strength properties but inferior plastering properties for an oil base drilling fluid.

Conclusions.

Many materials can be found which will lend good plastering properties to oil base drilling fluids and many materials can be found which will lend good gel strengths, but a material which will not only plaster excellently, but provide satisfactory gel strength and viscosity throughout the necessary temperature range is very rare. As nearly as can be determined at this time, asphalts show the most promise in regard to providing the properties necessary to an oil base drilling fluid. In general, most all asphalts aid the plastering properties of oil base drilling fluids, whether they be steam-refined, air-blown, or of the natural type. The air-blown and natural type provide the best plastering properties. Air-blown asphalts can be oxidized, however, to a point where the plastering properties are inferior to that of the correctly processed blown asphalt (Report No. 2). Most commercially available air-blown asphalts lend good plastering properties, but very few provide good gel properties throughout the necessary temperature range. Steam-refined and natural asphalts tend to possess very poor gel or thixotropic properties.

Note: If the correct type of asphaltic residuum or stock is selected and air-blown either with or without pressure blowing and with or without additional oxidizing agents, to a melting point of 260° F.-300° F. and a penetration of 7-14 m. m. at 25° C., a material will result which when used with the correct oil and gelling agent, and a weight material, will form an oil base drilling fluid which will not only have excellent plastering properties, but excellent gel and viscosity properties throughout the necessary temperature range.

Geo. Miller.

Subscribed and sworn to before me this 17th day of March, 1941.

Al. West,
Notary Public in and for the County of
Los Angeles, State of California.

My Commission Expires July 27, 1944.

(Seal)

Test No. S. T.

Sheet No.

Laboratory

DATA SHEET

EFFECT OF NATURAL ASPHALTS

GILSONITE

MATERIALS	%	%	%	%	%	%	%	%	%	%
$Ca(OH)_2$	4.0	8.0	20.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
SHELL STOVE OIL				50.0	50.0	50.0	50.0	50.0	50.0	50.0
UNION STOVE OIL	50.0	50.0	48.0							
GROUND OYSTER SHELLS		28.0	18.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
U. S. $CaCO_3$	33.0									
GILSONITE (SELECT)	13.0	14.0	14.0							
GILSONITE (M.P. 300-325°F)				13.0						
GILSONITE (M.P. 370°F)					13.0					
GILSONITE (M.P. 300-340°F)						13.0				
GILSONITE (M.P. 350°F)							13.0			
GILSONITE (M.P. 340°F.)								13.0		
GILSONITE (M.P. 380°F.)									13.0	
GILSONITE (M.P. 333°F)										13.0
VISCOSITY AT ROOM°	39.0	----	72.5	280.0	>400.	149.0	>300.	149.0	250.5	79.0
VISCOSITY AT 200°F.	4.0	4.0	6.0	6.0	8.5	5.0	6.0	6.0	5.0	4.0
VISCOSITY AT 260°F.	2.5	2.5	3.2	4.0	4.0	2.5	4.0	3.0	2.5	2.5
60 MINUTE THROUGHPUT	ZERO	2.7	8.8	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO	ZERO
GEL AT ROOM°	NIL	NIL	NIL	NIL	WEAK	NIL	POOR	NIL	POOR	NIL
GEL AT 200°F.	NIL	NILQ	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
GEL AT 250°F.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
GEL AT 260°F.	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

Test No. **S. T.** 2
Sheet No.
Laboratory

DATA SHEET

EFFECT OF NATURAL ASPHALTS

MATERIALS	%	%	%	%
CA(OH)$_2$	4.0	4.0	4.0	4.0
SHELL STOVE OIL	50.0	50.0	50.0	50.0
GROUND OYSTER SHELLS	33.0	33.0	33.0	33.0
TRINIDAD LAKE ASPHALT	13.0			
MANJAK NO. 10 (GLANCE PITCH)		13.0		
*GRANANITE			13.0	
MANJAK (GLANCE PITCH)				13.0
ALBERTITE WURTZILITE GRANANITE	HEATED TO OVER 700°F. AND WOULD NOT MELT. WOULD NOT CUT-BACK WITH STOVE OIL. TEND TO INTUMESCE UPON HEATING.			
ASPHALTUM (VENTURA CO.)	WOULD NOT DISSOLVE IN CS$_2$ OR OIL. (SOLID ROCK).			
VISCOSITY AT ROOM°	8.5	185.5	11.5	112.5
VISCOSITY AT 200°F.	2.0	6.0	2.5	4.0
VISCOSITY AT 260°F.	2.0	2.5	2.0	2.5
60 MINUTE THROUGHPUT	3.6	ZERO	ZERO	ZERO
GEL AT ROOM°	NIL	NIL+	NIL	NIL+
GEL AT 200°F.	NIL	NIL	NIL	NIL
GEL AT 250°F.	NIL	NIL	NIL	NIL
GEL AT 260°F.	NIL	NIL	NIL	NIL

*ONLY ABOUT 80% OF GRANANITE MELTED AND CUT-BACK WITH OIL, REMAINDER INTUMESCED.

Test No. S. T.

Sheet No. 3

Laboratory

DATA SHEET

EFFECT OF VARIOUS SUBSTANCES MATERIALS	%	%	%	%	%	%	%	%	%	%	
$CA(OH)_2$	4.0	4.0	4.0	4.0	8.0	4.0	3.8	2.0	1.0	NONE	8.0
SHELL STOVE OIL	50.0	50.0	50.0	50.0	46.0	52.0	53.9	54.0	56.0	56.0	47.
GROUND OYSTER SHELLS	33.0	33.0	33.0	33.0	26.0	34.0	37.5	39.0	38.0	39.0	25.
STEAM REFINED ASPHALT M.P. 165°F. PEN. 6-7	13.0										
STEAM REFINED ASPHALT M.P. 220°F. PEN. 3		13.0									
OZOCERITE WAX (BLACK)			13.0								
OZOKERITE WAX (GREEN)				13.0							
GUM ROSIN "Q"					20.0	10.0	4.8	5.0	5.0	5.0	
VENICE TURPENTINE											20.
COAL TAR PITCH	MELTED IN HOT STOVE OIL AND APPARENTLY MIXED, BUT UPON COOLING, SETTLED OUT SOLID. I.E., WOULD NOT CUT-BACK WITH STOVE OIL.										
VISCOSITY AT ROOM°	8.5	11.5	>400	52.0			>400	>400	6.0	.0	>400
VISCOSITY AT 200°F.	2.0	4.0	1.5	1.5			>300	22.0	2.0	1.5	22.
VISCOSITY AT 260°F.	1.5	2.0	1.0	1.0	FROZE SOLID - COULD NOT TEST	TOO PLASTIC TO TEST	8.5	6.0	1.5	1.0	4.
60 MINUTE THROUGHPUT	*25.0	75.0	7.3	70.0			1.5	0.5	90.0	147.0 1'22"	0.
GEL AT ROOM°	NIL-	POOR+	SOLID	V.G.			VVG	VVG	NIL	NIL	NIL+
GEL AT 200°F.	NIL-	NIL+	NIL	NIL			VVG	WEAK	NIL	NIL	NIL+
GEL AT 250°F.	NIL-	NIL	NIL	NIL			WEAK	NIL	NIL	NIL	NIL
GEL AT 260°F.	NIL	NIL	NIL	NIL			POOR	NIL	NIL	NIL	NIL

*THROUGHPUT NO WORSE DUE TO BAD SETTLING.

PLAINTIFF'S EXHIBIT 14.

Los Angeles Tulsa Houston

Baroid Sales Division
National Lead Company
Telephone Michigan 1381
830 Ducommun Street—Los Angeles, California

Geo. L. Ratcliffe
General Manager

April 16, 1941

Mr. George Miller
Los Angeles, California

Dear Mr. Miller:

This refers to our letter to you under date of April 16th, 1940 regarding the matter of Oil Base Drilling Mud.

We wish to inform you that we have determined to go no further with reference to that matter, and we hereby release you from all obligations in connection therewith. We will however pay the bill of Lyon & Lyon for the preparation and filing of the patent application, which we understand has been prepared, but further expense in connection with that application and patent will have to be borne by you in the event that you intend to go further with it. This termination and release will take effect today.

Please note your acceptance of this and release of any further liability on our part.

Your very tryly
Baroid Sales Division
Geo. L. Ratcliffe
General Manager

I hereby accept the above and agree to release Baroid Sales Division of National Lead Company and National Lead Company from any liability in accordance with the above.

Geo. Miller

JHB:TB C/Htn—JHB

PLAINTIFF'S EXHIBIT 15.

Patented May 15, 1923. **1,455,010**

UNITED STATES PATENT OFFICE.

JOHN C. SWAN, OF MARIETTA, OHIO.

METHOD OF DRILLING WELLS.

No Drawing. Application filed October 29, 1919. Serial No. 334,126.

To all whom it may concern:

Be it known that I, John C. Swan, a citizen of the United States, residing at Marietta, in the county of Washington and State of Ohio, have invented certain new and useful Improvements in Methods of Drilling Wells, of which the following is a specification.

My invention relates to an improvement in the present methods of drilling wells, particularly wells drilled for oil. Heretofore, it has been the practice in the various stages of well drilling to use water either that naturally present in the well or added water for the purpose of making the action of the drilling tools operatively effective.

My invention consists broadly in the substitution for water, under certain conditions as hereinafter specified, of a viscid or viscous liquid preferably heavier than water and preferably also having additional qualities which furnish advantageous results in this particular art.

The liquid which I prefer to use is tar, and I prefer to use a neutral tar, or one free from alkaline or acid ingredients. The tar, if not sufficiently liquid, may be brought to the desired liquid condition either by dilution of the mixture with suitable diluents or solvents such as the heavier oil fractions obtained in coal tar distillation; or with benzol or other solvent, or by heating it to make it more liquid.

My invention is capable of application under a number of the conditions arising in drilling wells. Thus, when starting a well, it is customary to drive pipe through the loose formation above bed-rock and water is added, if not naturally present.

The purpose of adding this water is to furnish a menstruum for the suspension of the drill grindings, in cleaning out the interior of the pipe or drilling below it. By substituting a heavier or viscid liquid for the water we get the advantage both of its greater flotative capacity for suspending the sand and pebbles, and of its capacity to maintain these materials in suspension. When water is used the sand and pebbles must be ground to a fine powder under the action of the bit before obtaining this result.

In addition the viscid fluid infiltrates into the loose formations around the pipe and below the pipe after the drill bit has passed out of the lower end of the drive pipe, and will bind loose sand and gravels against so readily flowing into the hole drilled ahead of the pipe, thereby enabling the driller to push his operations further before the necessity arises for again driving pipe to greater depths, thus saving the time lost in making the necessary changes, to say nothing about the more rapid drilling accomplished below the pipe by the use of a viscid liquid.

Further, by the use of the drilling liquid, the exterior of the pipe is coated, the liquid acting as a lubricant to reduce the skin-friction between the pipe and the surrounding earth material, thereby facilitating the driving of the pipe. After the pipe is driven home, to-wit, to bed-rock, the pipe will be found completely coated on the outside by the viscid fluid which will protect it for an indefinite period against rust and corrosion, and will reduce the difficulty of removing the same when the time comes to pull it out and recover the pipe. This coating will also protect the interior of the pipe, the same being coated with this drilling fluid. After the drive pipe has reached bed rock, it may be raised a short distance and a fresh supply of viscid liquid, which may be of such consistency as to become plastic or even congeal at the temperature of the water, is then fed into the pipe and displaced therefrom into the surrounding sand. When the pipe is again lowered, the joint between the pipe and bed rock will be completely sealed. Obviously this method is applicable at any point in the well.

In shale formations, where they are known to have caving characteristics, a liquid of the kind described should be used exclusively for drilling, primarily for the purpose of filling and protecting the walls of the well as fast as the same are formed. For this particular drilling and wall-treating purpose combined, I recommend the use of very hot liquid, up to 400° F., as giving better results on the wall than colder or cold liquid, due to a better infiltration of the wall face by the heated liquid. When coal tar is used, owing to some not well understood reactions between coal tar and rock formations when the tar is applied at high temperatures, there is produced a hardening of the wall structure and practical protection against weathering and caving.

In rotary drilling it is customary to supply mud consisting of clay and water to the pumps which force the mud into proximity to the cutting surfaces. This mud in returning outside of the drill pipes, in addition to removing the cuttings of the drill, plasters up the wall of the well and prevents caving, and tends to shut off water and gas. In this type of drilling the substitution of a viscid liquid of the character above described for the mud heretofore used is particularly advantageous, since the removal of the cuttings takes place with greater facility and the viscid liquid is better adapted for sealing the wall of the well because of the permanent binding effect due to its viscidity. What has been here stated with reference to the rotary drilling is equally applicable to what is now known as the cable tool hydraulic circulating system of drilling. In many instances where the use of the hydraulic circulating system has been considered essential, my method enables the use of the ordinary cable-tool process, because owing to the continuous treatment of the wall of the well by the viscid liquid, gas, water and caves are sealed off as fast as uncovered.

For the purpose of keeping the casing permanently loose and removable at will, the casing should be lowered into the well in such a manner as to force the viscid drilling fluid, as by pneumatic or hydraulic pressure, between the casing and the well wall for the entire length of the casing, thereby permanently shutting off all water from entering from behind the casing into the well, thereby obviating the necessity of cementing the well, with all the expense, delays and disappointments incident to the use of that process.

The result of this operation is a cased well having on the exterior of the casing a coating of viscid liquid in intimate contact with the wall of the well. This feature of my invention is applicable to wells which have been drilled by ordinary methods. In case it is desired to shut off from such wells any water or gas, the casing is raised a short distance, a sufficient quantity of the viscid liquid is lowered by a dump bailer. and the liquid is then displaced by any of the well-known methods and forced up around the outside of the casing. The casing is then lowered into its former position.

The drilling liquid, such as tar, may be collected in sumps or tanks at the surface after having been used in the well and can be recovered for further use in any suitable manner.

In sand rock drilling, I do not advise the use of this fluid unless its added cost as compared with water proves it to be economical in the lessened wear of the steel of the bit and the time necessary for drilling a given distance; however, even in this type of drilling, the sand suspended in water has a constant tendency to settle out and stick the drilling tools unless they are kept in constant motion, and this action is prevented by the use of a heavy viscid liquid.

While I have specifically referred to coal tar as the drilling liquid which I use, other non-aqueous, non-hygroscopic liquids or solutions having like physical and chemical characteristics may be used, such as wood tar, rosin dissolved in heavy tar oil, or asphalt dissolved in benzol.

While I prefer to use a liquid, such as coal tar, which is heavier than water, this characteristic is not in all cases essential as lighter liquids may in some instances be used.

A further very important advantage of my method is that the presence at the bottom of the well and around the casing, of a mobile but viscid liquid, particularly if such liquid be highly viscous or even plastic at the temperature there existing, so permanently seals the casing into the surrounding walls that "blow-outs" may be entirely obviated. The viscid liquid is conformable to any change in the conformation due to gas-pressure and therefore acts as an effective seal under all conditions.

I claim:

1. The method of drilling cased wells which consists in carrying out the drilling operations with an anti-corrosive liquid more viscid than water, and having a higher specific gravity than water.

2. The method as claimed in claim 1 in which the viscid liquid is tar.

3. The method of drilling cased wells which consists in carrying out the drilling operations with an anti-corrosive liquid more viscid than water and coating the casing inside and out with the viscid liquid.

4. The method as claimed in claim 3 in which the wall of the well is impregnated with the viscid liquid.

5. The method of sealing cased wells which consists in displacing a viscid sealing fluid from within the casing into the surrounding space, and then lowering the casing through the body of liquid.

6. The method of sealing cased wells which consists in introducing a non-aqueous non-hygroscopic viscid liquid into the space between the casing and the surrounding wall of the well.

In testimony whereof I affix my signature.

JOHN C. SWAN

UNITED STATES PATENT OFFICE

2,223,027

NONAQUEOUS DRILLING FLUID

Reginald David Dawson, Tjepoe, and Philippus Henderikus Huisman, Pangkalan Brandan, Dutch East Indies, assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware

No Drawing. Application May 31, 1939, Serial No. 276,632. In the Netherlands June 2, 1938

10 Claims. (Cl. 255—1)

The present invention relates to improvements in drilling fluids for oil and gas wells and pertains more particularly to the oil-base type.

Non-aqueous drilling fluids or muds are usually prepared in a manner analogous to the preparation of clay-water base muds, that is, by suspending finely divided substances, such as haematite, galena, barytes, burnt clay, silica, crushed oyster shells, etc., in oils, e. g. mineral oils or fractions thereof such as gas oils. Various substances such as alkaline soaps, voluminous magnesium carbonate or oxide, etc., are added, if necessary, to prevent the settling out of the solid particles. It has also been proposed to add natural or synthetic asphalt for the purpose of improving the deplastering properties of these muds.

However, an outstanding deterent to the use of these nonaqueous drilling fluids is their unsatisfactory plastering properties, that is, their inability to prevent excessive loss of fluid to the formation and loss of production due to clogging of the pores of the oil-bearing formations by penetration thereinto by the drilling fluids and their contained solids. A thin, adherent and impermeable mud sheath must be formed on the walls of the borehole to prevent these undesirable occurrences.

It is therefore an object of the present invention to provide for drilling gas and oil wells a nonaqueous drilling fluid of improved plastering properties. Additional objects will be apparent from the following description.

Briefly, the invention consists in the addition of blown asphaltic bitumens to nonaqueous drilling fluids, whereby the desired plastering properties are obtained.

By "blown" asphaltic bitumens we mean asphaltic bitumens that have undergone an oxidative treatment, i. e., have been exposed to the influence of air, oxygen, chlorine, permanganate and the like at elevated temperatures, according to methods well known to those skilled in the art, and which are more commonly called simply "blown asphalts."

Drilling fluids containing blown asphalts have the property of producing in a short time a complete plastering and sealing of the borehole wall, so that loss of drilling fluid during drilling through porous strata is eliminated. Conversely, drilling fluids treated with asphaltic bitumens not previously subjected to an oxidative treatment, such as normal steam asphalts, do not show this desirable property. As illustrative of the advantages of drilling fluids prepared according to our invention, Table I shows drilling fluids containing blown and non-blown asphalts compared in a standard mudding-off machine, in which low displacement of fluid through the mud sheath is indicative of a drilling fluid having desirable plastering properties. The drilling fluids were prepared by adding 20 parts by weight of the asphalt to a suspension of 126 parts of finely divided magnetite in 64 parts of crude oil which had been topped to 200° C. The initial permeabilities of the core samples used in these tests were nearly the same.

Table I

Exp. No.	Kind of asphalt	Type	Softening point (R & B) °C.	Penetration at 25° C., mm.	Viscosity of mud in degrees MacMichael	Ml. of displacement after—		
						10 min.	70 min.	90 min.
1	No asphalt					±25		
2	Netherlands Indies	Straight run	112	0	16	±25		
3	Mexican	Non-blown	41	18.5	5	±25		
4	do	Blown	85	41	10	1.0	1.2	1.2
5	Venezuelan	Non-blown			5	>24		
6	do	Blown			5	1.5	1.7	1.7
7	Panuco	Slightly blown	74.5	33	6	12.0	22	
8	do	More highly blown	85.5	33	7	3.5	2.6	2.6
9	Southern	Slightly blown	74	37	5	9.2	17.7	18.8
10	do	More highly blown	86	37	6	3.4	3.5	3.5

It is apparent from the above table that "blown" asphalt imparts to drilling fluids the desirable plastering properties, i. e., capable of low liquid displacement, while muds treated with non-blown asphalts are poor in these properties. As will be noted, this phenomenon is independent of the source of the asphalt used.

The above-mentioned favorable property is more pronounced as the oxidative treatment of the asphalt bitumens is further continued as may be seen from Table II below. For this purpose two kilograms of an asphalt were blown as highly as possible at a temperature of 300° C. Five gram samples were taken at each period indicated in the table, and incorporated in a suspension of 126 grams of finely ground magnetite in 62.5 grams of a crude oil which had been topped to 200° C. and tested in the mudding-off machine as above.

Table II

Exp. No.	Treatment of asphalt	Softening point (R & B) °C.	Penetration at 25° C., mm.	Asphaltene content, percent	Viscosity of mud in degrees MacMichael	Ml. of displacement after—		
						1 min.	40 min.	90 min.
1	Original material	54	45	19.4	3	±35	------	------
2	(I) after 120 l. air	65	25	24.9	3	21.2	------	------
3	(II) after 300 l. air	90	10.5	32.3	3	10.6	------	------
4	(III) after 450 l. air	120	6.5	39.0	3	2.5	10.5	16.3
5	(IV) after 600 l. air	147	5	42.1	4	0.9	4.7	7.2
6	End product	149	4.5	42.6	4	0.9	4.5	6.9

As will be seen from Table II, the improvement in plastering properties of muds increases as the degree of oxidation of the asphalt increases.

The effect of blown asphalt on the plastering properties of muds might be explained by assuming the formation, during the oxidative treatment of the asphalt bitumens of very fine solid particles which do not occur in natural or artificial asphalt bitumens and the fineness of which cannot even be approximated by very intensive grinding of solid substances, such as porcelanite or zinc oxide.

In general, a drilling fluid prepared according to the present invention contains about 5 to 15% of blown asphaltic bitumens and 30 to 60% of a finely divided solid or weighting material suspended in an oil, although greater or lesser amounts may be used, if desired.

Various weighting and settling inhibitors may be added to drilling fluids containing blown asphalts. For example, a composition which may be used for drilling wells comprises 9.8 parts by weight blown asphalt, having a softening point (R & B) of 107° C. and penetration at 25° C. of 15 mm., 49.5 parts of stove oil, and 40.7 parts of ground oyster shells. Another composition which was found to be effective in completing an oil well consisted of 51.9% absorption oil, 34.7% ground shell, 9.9% blown asphalt, having the same properties as the aforementioned asphalt, and 3.5% of a settling inhibitor, such as lampblack or carbon black.

We claim as our invention:

1. A nonaqueous drilling fluid comprising oil, finely divided solid material and blown asphaltic bitumen.

2. A nonaqueous drilling fluid comprising oil, finely ground magnetite, and blown asphaltic bitumen.

3. A nonaqueous drilling fluid comprising oil, finely ground oyster shells, and blown asphaltic bitumen.

4. A nonaqueous drilling fluid comprising oil, finely ground oyster shells, a settling inhibitor, and blown asphaltic bitumen.

5. A nonaqueous drilling fluid comprising 5 to 15% of blown asphaltic bitumens and 30 to 60% of a finely divided solid material suspended in an oil.

6. A nonaqueous drilling fluid comprising oil, finely divided solid material, blown asphaltic bitumen, and lamp black as a settling inhibitor.

7. In drilling oil and gas wells, the step of circulating in the borehole during drilling an oil-base drilling fluid comprising a blown asphaltic bitumen.

8. In drilling oil and gas wells, the step of circulating in the borehole during drilling an oil-base drilling fluid comprising a blown asphaltic bitumen and lamp black.

9. A nonaqueous drilling fluid comprising oil, a finely divided solid material, a settling inhibitor, and blown asphaltic bitumen.

10. In drilling oil and gas wells, the step of circulating in the borehole an oil base drilling fluid comprising a finely divided solid material, a settling inhibitor, and blown asphaltic bitumen.

REGINALD DAVID DAWSON.
PHILIPPUS HENDERIKUS HUISMAN.

Patented Nov. 5, 1940 PLAINTIFF'S EXHIBIT 17. **2,220,681**

UNITED STATES PATENT OFFICE

2,220,681

NONAQUEOUS DRILLING FLUIDS

Philippus Henderikus Huisman, Pangkalan Brandan, Dutch East Indies, assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware

No Drawing. Application May 23, 1939, Serial No. 275,182. In the Netherlands June 2, 1938

3 Claims. (Cl. 255—1)

This invention relates to improvements in nonaqueous drilling fluids for use in drilling wells. More particularly it relates to the use of stabilizing agents in oil base drilling fluids containing weighting materials which have a tendency to settle out.

In the art of drilling wells for oil or gas by the rotary method, ordinarily a fluid composed of a suspension of clay in water is pumped down the drill pipe through the drill bit in order to wash to the surface the particles of earth cut by the bit. During drilling, heaving shale formations are frequently encountered which swell and disintegrate on contact with water and cave into the hole. Often this movement of shale freezes or sticks the drill pipe and bit, making it difficult or impossible to remove these tools from the hole. As it is sometimes impossible to penetrate these shale formations by ordinary methods of drilling which use water-base mudflushes, it has been previously proposed to use a drilling fluid composed of a suspension in a nonaqueous medium, such as oil, of ground weighting materials such as finely divided hematite, galenite, barytes, silica, ground oyster shells, etc. Ordinarily, weighting materials in nonaqueous suspensions have an excessive tendency toward sedimentation and to overcome this deficiency of nonaqueous drilling fluids, slaked lime and other alkaline substances have been proposed as stabilizing agents. However, such alkaline stabilizing agents are often unsatisfactory and fail to prevent sedimentation of weighting material in drilling fluids, especially in fluids of relatively high or relatively low specific gravities, that is, in fluids containing relatively high or relatively low amounts of inert weighting materials.

It is therefore an object of this invention to provide an improved drilling fluid which is stable both at relatively high specific gravity and at relatively low specific gravity and which comprises as a stabilizing agent or sedimentation inhibitor voluminous magnesium oxide or carbonate.

Voluminous magnesium oxide may, for example, be prepared by burning or calcining magnesium carbonate. It is understood that only those varieties of magnesium carbonate which are of the voluminous or fluffy type are suitable for preparation of nonaqueous drilling fluids according to the present invention. These sedimentation inhibitors, namely voluminous magnesium oxide and carbonate, impart thixotropic properties to nonaqueous drilling fluids, and make it not only possible, according to the present invention, to prepare drilling fluids which are very stable, but the amount of weighting material can also be raised to such an extent as to produce drilling fluids of high specific gravity such as 3, 3.5 or higher. For example, a drilling fluid having a specific gravity of 3.5 and consisting of 85 parts by weight galenite and 15 parts by weight of crude oil topped to 200° C. formed a highly solid sediment after standing one-half hour. On addition of 3 parts by weight voluminous magnesium oxide to a drilling fluid of the same composition, no appreciable sedimentation occurred after 24 hours' standing. Such high specific gravity muds are eminently suitable for use in formations in which high pressures occur.

Another particular advantage of nonaqueous drilling fluids containing voluminous magnesium oxide or carbonate is that these drilling fluids are not affected to any appreciable extent by high temperatures occurring within deep wells. Nor does dilution with water increase the rate of sedimentation of weighting materials in the drilling fluids prepared according to this invention.

By using voluminous magnesium oxide or carbonate, it is possible to prepare, in addition to highly stable drilling fluids of high specific gravity, also drilling fluids which are stable and have relatively low specific gravities, such as, for example, 1.75, 1.5 or lower. Previously it had not been possible to prepare a nonaqueous drilling fluid containing a relatively small amount of weighting fluid without it showing an excessive tendency towards sedimentation. For example, a drilling fluid with a specific gravity of 1.5 consisting of 38 parts by weight of galenite (passed through a 325 mesh sieve-A. S. T. M.) and 48.8 parts by weight crude oil topped to 200° C. yielded a solid sediment after standing 24 hours. But on addition of 13.2 parts by weight of voluminous magnesium oxide to a drilling fluid of the same composition, a homogeneous suspension was maintained.

In the normal specific gravity range of nonaqueous drilling fluids, suspensions prepared with voluminous magnesium oxide or carbonate show less tendency toward sedimentation than do similar suspensions stabilized with slaked lime and like substances. For instance, a drilling fluid with a specific gravity of 2.5, consisting of 71 parts by weight galenite and 29 parts by weight crude oil topped to 200° C. yielded a solid sediment after standing 24 hours. Upon adding 4 parts by weight of lime to the fluid of this composition, a solid sediment was also formed in the same time. However, a homogeneous suspension was maintained after adding to the fluid 4 parts by weight of voluminous magnesium oxide.

In general, the sedimentation inhibitors may be used in quantities from 1% to 20% based on the weight of the drilling fluid, although greater or lesser amounts may be used, depending on the amount, density, and kind of the material suspended in the fluid and other requirements such as may be particular to each drilling fluid or application.

Other finely divided solids of voluminous or foraminate or fluffy character and capable of imparting thixotropic properties to nonaqueous drilling fluids may be used. Thus, although voluminous magnesium carbonate or oxide are preferable due to the superior nature of drilling fluids prepared with them, certain types of carbon black and lampblack, such as, for example, the product known as "short" carbon black to the printers' ink trade, may likewise be used if availability and economy warrant their use.

I claim as my invention:

1. A drilling fluid comprising a mineral oil, a weighting material, and voluminous magnesium carbonate as a sedimentation inhibitor.

2. A drilling fluid comprising a mineral oil, a weighting material, and voluminous magnesium oxide as a sedimentation inhibitor.

3. In drilling a well the step of circulating therein a drilling fluid comprising a mineral oil, a finely comminuted solid material dispersed therein, and a sedimentation inhibitor selected from the group consisting of voluminous magnesium oxide and carbonate.

PHILIPPUS HENDERIKUS HUISMAN.

Patented Nov. 26, 1940 PLAINTIFF'S EXHIBIT 18. **2,222,949**

UNITED STATES PATENT OFFICE

2,222,949

NONAQUEOUS DRILLING FLUID

Rudolf August Henkes, Maracaibo, Venezuela, assignor to Shell Development Company, San Francisco, Calif., a corporation of Delaware

No Drawing. Application February 26, 1940, Serial No. 320,887. In the Netherlands April 6, 1939

4 Claims. (Cl. 255—1)

This invention relates to improvements in nonaqueous drilling fluids for use in drilling wells. More particularly it relates to the use of stabilizing agents in oil base drilling fluids containing weighting materials which have a tendency to settle out.

In the art of drilling wells for oil or gas by the rotary method, ordinarily a fluid composed of a suspension of clay in water is pumped down the drill pipe through the drill bit in order to wash to the surface the particles of earth cut by the bit. During drilling, heavy shale formations are frequently encountered which swell and disintegrate on contact with water and cave into the hole. Often this movement of shale freezes or sticks the drill pipe and bit, making it difficult or impossible to remove these tools from the borehole. As it is sometimes impossible to penetrate these shale formations by ordinary methods of drilling which use water-base mudflushes and, also, since in completing wells oil layers are sometimes plugged by the penetration thereinto of water from water-base mudflushes, it has been previously proposed to use a drilling fluid composed of a suspension in a nonaqueous medium, such as mineral oil, coal and tar distillates, topped crude oil, gas oil, kerosene, etc., of weighting materials such as finely divided hematite, galenite, barytes, silica, clay, calcium carbonate, for example, ground oyster shells, etc. Ordinarily, weighting materials in nonaqueous suspensions have an excessive tendency toward sedimentation and to overcome this deficiency of nonaqueous drilling fluids, slaked lime and other alkaline substances have been proposed as stabilizing agents. However, such alkaline stabilizing agents are often unsatisfactory and fail to prevent sedimentation of weighting material in these drilling fluids, especially in fluids of relatively high or relatively low specific gravities, that is, in fluids containing relatively high or relatively low amounts of inert weighing materials.

It is therefore an object of this invention to provide an improved nonaqueous drilling fluid which is stable both at relatively high specific gravities and which comprises lampblack as a stabilizing agent or sedimentation inhibitor.

Lampblack has been found to be an especially desirable stabilizing agent for nonaqueous drilling fluids. Not only does its use develop a suitable weak gel structure which prevents sedimentation of the weighting materials, but the stabilizing action is unaffected by the necessary use of plastering agents, such as blown asphalt. Likewise, lampblack, due to its relatively large amorphous particles, does not cause permanent plugging of the porous formations; that is, good deplastering is not impaired by its use. In this regard, lampblack is definitely superior to other stabilizing agents such as, for example, carbon black, which, due to the small size and crystalline nature of its particles, permanently plugs porous formations and therefore often cannot be advantageously used. Lampblack also possesses certain oiliness properties which make it readily miscible with oil, that is, very easily wetted by oil, a property not possessed by carbon black.

Due to the thixotropic properties imparted to nonaqueous drilling fluids by lampblack, it is possible to prepare, in addition to very stable drilling fluids of ordinary specific gravities, such as about 2.0, also drilling fluids which are stable and have relatively low specific gravities, such as, for example, 1.5, 1.2 or lower. Previously it had not been possible to prepare a nonaqueous drilling fluid containing a relatively small amount of weighting material, without it showing an excessive tendency toward sedimentation. For example, a drilling fluid with a specific gravity of 1.20, consisting of 37.5 parts by weight of ground porcellanite, 51.1 parts by weight of a crude oil topped to 200° C., and 8.5 parts by weight blown asphalt yielded a solid sediment after standing for 24 hours. But on addition of 2.9 parts by weight lampblack to a drilling fluid of the same composition, a homogeneous suspension was maintained throughout an equal period of time.

By using lampblack, it is not only possible, according to the present invention, to prepare drilling fluids which are very stable but the amount of weighting material can also be raised to such an extent as to produce drilling fluids of high specific gravities, such as 3, 3.5, or higher, which are eminently suited for use in formations in which high pressures occur.

Another particular advantage of nonaqueous drilling fluids containing lampblack is that the stability of these drilling fluids is not affected to any appreciable extent by high temperatures such as 160–200° F. occurring within deep wells.

The beneficial effect of lampblack on the sedimentation properties of oil-base drilling fluids may be seen from the results of the tests shown in the table. In these tests samples of the composition indicated were allowed to stand in graduated cylinders. At the times shown, the amount of oil which had separated from the oil-weighting material mixture, or from which the weighting material had settled, was taken as a measure of the sedimentation and is expressed as a percentage of the total volume of mixture. Thus, a high percentage of oil containing no weighting material indicates much sedimentation and a low value, conversely, indicates little sedimentation.

Table

Exp. No.	Composition of drilling fluids, parts by weight			Lampblack added in percent by weight of drilling fluid	Specific gravity	Percent settling after—		
	Stove oil	(Weighting material)				1 hr.	7 hrs.	16½ hrs.
		Ground shells	Barytes					
1	125	252.5	--------	0	1.05	40	-----	49
2	125	252.5	--------	1	1.05	18	-----	46
3	125	252.5	--------	3	1.05	2	-----	24
4	125	252.5	--------	5	1.05	0	-----	7
5	122.5	--------	84.1	0	1.24	65.5	72	-----
6	122.5	--------	84.1	1	1.24	43	60	-----
7	122.5	--------	84.1	3	1.24	15	32	-----
8	122.5	--------	84.1	5	1.24	0.5	5.5	-----

In general, the sedimentation inhibitor, namely, lampblack, may be used in quantities from 1% to 10% and preferably from 2–6% based on the weight of the drilling fluid, although greater or lesser amounts may be used, depending on the amount, density, and kind of material suspended in the fluid and other requirements such as may be particular to each drilling fluid or application.

In preparing a stable mudflush according to the present invention, if blown asphalt is to be used in the composition, the oil is first mixed therewith according to suitable methods for making asphalt cutbacks. To this oil or oil-asphalt base the weighting material, such as oyster shells, and the lampblack are added in the order desired. That is, either the shells or the lampblack may be added first, or the two may be mixed dry and then added to the oily base. After the oily base, the weighting material and the lampblack are suitably mixed together, the resultant stable nonaqueous mudflush is ready for use in the well.

I claim as my invention:

1. A drilling fluid comprising a mineral oil, a weighting material, and lampblack as a sedimentation inhibitor.

2. A nonaqueous drilling fluid comprising mineral oil, a finely divided solid material suspended therein, and lampblack as a sedimentation inhibitor.

3. A drilling fluid comprising a mineral oil, a finely divided solid material, and 2 to 6 percent by weight of lampblack as a sedimentation inhibitor.

4. In drilling a well, the step of circulating therein a drilling fluid comprising a mineral oil, a finely divided solid material suspended therein, and lampblack as a sedimentation inhibitor.

RUDOLF AUGUST HENKES.

PLAINTIFF'S EXHIBIT 19.

Douglas Oil Co. of California

Address Communications to 612 South Flower Street, Los Angeles 17, California: telephone, MAdison 9-1675

Baroid Sales Division
National Lead Company
830 Ducommon Street
Los Angeles 12, California

October 13, 1950

Attention: W. E. Alsop

We refer to our telephone conversation relative to a specification on Mineral Rubber. Set forth below are the specifications on this type of material that we are currently supplying to one of the large manufacturers for shipment to Hawaii:

Melting Point	260-290°
Penetration at 77°F	0-5
Specific Gravity	1.0-1.05
Loss on Heating at 325°F 5 hours	4% maximum
Benzene Soluble	99%
Ash	1% maximum
Foreign material	none

The product is an airblown asphalt packed in 100 lb. fiber cartons. We quote $45.00 per ton FOB our refinery, 8622 East Compton Boulevard, Paramount, California (Los Angeles County). This price is quoted on a minimum of 40-ton loads.

If we can be of further service to you, please call the writer at this office.

Very truly yours,

Douglas Oil Co. of California
William F. Lyte
Vice President

WFL:hm

Producers . Refiners . Marketers . Refineries: Santa Maria. Bakersfield. Paramount

Patented Apr. 20, 1943 DEFENDANT'S EXHIBIT A. **2,316,967**

UNITED STATES PATENT OFFICE

2,316,967

OIL BASE DRILLING FLUID AND METHOD OF REGENERATING THE SAME

George Miller, San Marino, Calif.

No Drawing. Application June 24, 1941,
Serial No. 399,510

6 Claims. (Cl. 252—8.5)

This invention relates to an oil base drilling fluid for use in drilling wells and to a method of regenerating such oil base drilling fluid where the same becomes contaminated with water.

Oil base drilling fluids are mainly used while drilling through oil or gas producing formations, but are also used to combat hydrous disintegrating shales, or caving formations. Where aqueous mud fluids are employed during drilling through a productive formation, the permeability of the formation is appreciably reduced as a result of the watering or mudding of the formation by the mud fluid. For this reason, oil base drilling fluids are preferred for drilling through productive formations. Non-aqueous drilling fluids of certain types have the advantage that they do not lose water into the productive formations and will readily deplaster.

The general properties desired in an oil base drilling fluid are that the viscosity of the fluid must be within allowable limits, the fluid should maintain a good gel strength throughout the temperature range to be encountered, the fluid should possess good plastering properties and leave the formation in a condition to be readily deplastered, the drilling fluid should be susceptible of manufacture with a weight range of at least from 68 to 90 pounds per cubic foot, and the fluid should be capable of regeneration to remove water after the fluid becomes contaminated therewith.

It is the general object of the present invention to provide an oil base drilling fluid possessing all of the aforesaid desirable properties.

It is a further object of the present invention to provide a process by which an oil base drilling fluid may be readily and economically regenerated whenever the same becomes contaminated with water.

To provide the gel strength desired in an oil base drilling fluid, the art has previously employed lamp black. When lamp black is employed for this purpose, the viscosity and gel strength of the fluid is satisfactory at ordinary temperatures but is unsatisfactory at higher temperatures. Furthermore, a drilling fluid containing lamp black is very disagreeable to handle and has been the cause of much labor difficulty. The present invention includes the discovery that a superior oil base drilling fluid is provided by including in the drilling fluid a material, which material will slake in contact with water with the evolution of much heat. Calcium oxide and strontium oxide are examples of materials which slake in contact with water with the evolution of much heat. An excess of such materials over that necessary to combine with water may be employed. When such an excess is employed, the excess material initially acts as an inert weight material, but functions to prevent the drilling fluid from becoming undesirably contaminated with water. Any tendency of the drilling fluid in operation to become contaminated with water is offset by the excess material slaking with such water to form relatively insoluble hydroxides.

The preferred material for use in the present invention is calcium oxide. When calcium oxide is employed, it reacts with water in accordance with the following equation to form calcium hydroxide, a material which increases the gel strength of the drilling fluid:

$$CaO+H_2O=Ca(OH)_2$$

The reaction between calcium oxide and water not only produces a material which adds to the gel strength of the fluid, but also aids in the plastering properties of the fluid. Moreover, certain fluids employing calcium oxide are unaffected by water contamination up to at least 15% by volume, and by heating up to 260° F. I have further found that during the use of an oil base drilling fluid the water content of the drilling fluid may be maintained at a desirable low value by routine additions of calcium oxide. Part of the advantages of the drilling fluid of the present invention are undoubtedly due to the better dispersion of the asphalt in the drilling fluid effected by the heat generated when the calcium oxide is slaked with water.

Other materials may be employed in place of calcium oxide and serve the purpose of chemically combining with water, seeking to contaminate the drilling fluid, to thereby remove the water from the oil base drilling fluid. Among the other materials which I have found suitable for this purpose are magnesium oxide and anhydrous copper sulphate.

With the drilling fluid of the present invention water will not be taken from the drilling fluid by the oil sands, nor can water wet any of the ingredients of the drilling fluid which might thereby promote settling of such ingredients from the drilling fluid.

While each of the materials described has the advantage of chemically combining with water to remove the water from the oil base drilling fluid, the materials, calcium oxide and magnesium oxide, in addition so combine with the water as to have the property of producing a good gel strength in the drilling fluid, thereby acting to provide for the formation of a permanent drilling fluid from which the weighting material will not separate. In certain cases it is found that the use of voluminous magnesium oxide results in an excessive gel strength when used in connection with certain types of asphalt. Only calcium oxide, however, slakes in water with the evolution of much heat and is capable of adequately dispersing the asphalt of the drilling fluid and of improving the plastering properties of the drilling fluid. Furthermore, the gel strength provided by magnesium oxide is satisfactory over only a narrow temperature range, whereas the use of calcium oxide provides a drilling fluid with a satisfactory gel strength over a comparatively wide temperature range as hereinafter pointed out. The materials—strontium oxide and anhydrous copper sulphate—while combining with water to remove the same from drilling fluids do not improve the gel strength of the drilling fluid and should, therefore, be used only in connection with the drilling fluid containing some other agent for providing the desired gel strength, such as calcium or magnesium hydroxides. Of the foregoing materials, calcium oxide is at present the cheapest, while magnesium oxide compares in price range with the price range of lamp black, but the cost of the other mentioned agents is such at the present time as to make their use less desirable.

Copper sulphate is most effective from a weight and ratio standpoint for the purpose of removing water and thereby regenerating the oil base drilling fluid. It will be noted also that strontium oxide is the least effective from this standpoint. The difference in ratio between calcium oxide and magnesium oxide indicates that magnesium oxide is the most effective as regards regeneration of the non-aqueous drilling fluid. Magnesium oxide increases the viscosity and gel strength of the drilling fluid, but does not improve the plastering properties, as is the case with calcium oxide. I have found that the light and fluffy varieties of magnesium oxide impart an excessive gel strength to the drilling fluid both before and particularly after hydration, so that where magnesium oxide is to be employed I prefer to use the denser varieties of magnesium oxide, such as dead-burned magnesium oxide. Calcium oxide has the advantage over voluminous magnesium oxide not only in that it improves the plastering properties of the drilling fluid, but also in that it is more effective as a weighting material.

The drilling fluid and method of regenerating fluids of the present invention, together with various additional advantages of the invention, will be apparent from the following description of the preferred specific examples of drilling fluids embodying my invention.

In the preferred form of the invention, I employ stove oil or gas oil as the oil base of the fluid. For weighting material I employ calcium carbonate, oyster shell lime, or barytes. For providing the desirable viscosity and plastering properties, as well as part of the gel strength of the fluid, I employ either air-blown asphalt or mineral rubber. For providing gel strength, and improved plastering properties, I employ calcium oxide and water. As one example of a preferred drilling fluid, I employ such ingredients in the following proportions:

Table

Per cent by weight	Material
50	Stove oil or gas oil.
33	Calcium carbonate or oyster shell lime.
13	Blown asphalt or mineral rubber.
3.02	Calcium oxide } 4% by weight calcium hydroxide.
0.98	Water

The foregoing oil base drilling fluid has been shown to be unaffected by temperatures up to 260° F., or by water contamination up to over 11% by volume, and in some tests it has been shown that there is no harmful effect noticeable upon the drilling fluid by contamination with water up to 15%, or slightly greater quantities of water. During the use of such drilling fluid in oil drilling operations, the drilling fluid may be readily regenerated by periodic appropriate additions of calcium oxide or other material in suitable proportion to combine with the water contaminating the drilling fluid and thereby removing the water from the drilling fluid. For the purpose of maintaining the drilling fluid throughout drilling operations non-aqueous in character, the practice of making routine additions of the material to the drilling fluid may be followed.

While I have described the employment of calcium carbonate or oyster shell lime as the weighting material, it is obvious that any suitable or desirable form of weight material may be utilized. It is also possible in accordance with the present invention to initially produce an oil base drilling fluid which will be self-regenerating, and for this purpose it is only necessary to include in the initial composition of the drilling fluid a sufficient excess of the calcium oxide so as to provide for the desired self-regenerating properties. Such an excess of calcium oxide merely acts as additional weighting material until there is a tendency of the drilling fluid to become contaminated with water. The weight of calcium oxide closely approximates the weight of the weight material desirable for the drilling fluid. By the use of an excess of calcium oxide, it will be apparent that as additional water is taken up by the drilling fluid from the surroundings or from the drilling hole or oil sand, this water reacts with the calcium oxide in producing a further quantity of hydrated lime or gel material, and in a way not detrimental to the drilling fluid itself.

To illustrate the process of regenerating the oil base drilling fluids of the present invention, in one example, an oil base drilling fluid was employed having an original composition of 50% stove oil, 31% oyster shell lime, 14% asphalt, and 5% hydrated lime produced by the addition of approximately 3.78% calcium oxide, and 1.22% water. This drilling fluid had a weight of 72 pounds per cubic foot. After contamination of this drilling fluid with water up to 6.0% by volume, there was added approximately 6.8% by weight of calcium oxide, and the water content of the drilling fluid was thereby reduced to 1.2% by volume (A. S. T. M. test) free water, while the properties of the drilling fluid were improved slightly over the original fluid, especially at high temperatures.

In another example of the process of the present invention, the same drilling fluid contaminated by water was regenerated by the addition of approximately 6.8% of magnesium oxide. This reduced the water content of the drilling fluid to 0.65% (A. S. T. M. test). While the addition of the magnesium oxide was thus more effective in removing water than the addition of the calcium oxide, the regenerated drilling fluid was less satisfactory from the standpoint of its properties of plastering and viscosity than was the case of the mud regenerated by the use of calcium oxide. As a further example in another case, the same drilling fluid contaminated with water was regenerated by the addition of approximately 6.8% anhydrous copper sulphate. This reduced the water content to 3.6% (A. S. T. M. test), while the properties of the drilling fluid remained otherwise substantially unchanged.

In another example of the invention, the drilling fluid was made originally containing 50% stove oil, 31% oyster shell lime, 14% asphalt, and 5% magnesium hydroxide produced through the addition of magnesium oxide and water. This drilling fluid weighed 72 pounds per cubic foot. This drilling fluid was then contaminated with 6% water, and it was noted that the addition of the water had substantially no effect on the properties of the drilling fluid. Approximately 5.45% of magnesium oxide was then added to the drilling fluid for the purpose of regenerating the same. The water was found to be reduced to 2.3% (A. S. T. M. test).

As a further example of the drilling fluid embodying the present invention, a drilling fluid was prepared originally having a composition consisting of 50% stove oil, 31% oyster shell lime, 14% asphalt, and 5% hydrated lime produced by the addition of appropriate quantities of calcium oxide and water. Such a drilling fluid weighed 72 pounds per cubic foot. In order to provide such drilling fluid with self-regenerating properties, there was then added an additional 3.7% calcium oxide. It was found that the plastering properties of the drilling fluid were improved, that the viscosity remained about the same as before, and that the gel properties remained satisfactory at temperatures as high as 200° F. This drilling fluid had the property of maintaining itself free from water contamination when an additional 1.4% water was added.

While the particular oil base drilling fluid and the method of regenerating the same herein described are well adapted to carry out the objects of the present invention, it is to be understood that various modifications may be made, and the invention is of the scope set forth in the appended claims.

I claim:

1. A process of maintaining an oil base drilling fluid substantially free of water during drilling operations, which includes routine addition thereto of substantial amounts of unslaked calcium oxide whereby the water content of the drilling fluid is maintained at substantially zero.

2. The method of regenerating a water contaminated non-aqueous drilling fluid, which comprises, adding unslaked calcium oxide to said drilling fluid to combine with said water, said unslaked calcium oxide being added in sufficient amount to reduce the water content of said fluid to a value which has no material effect upon the properties of said non-aqueous drilling fluid.

3. The method of regenerating a water contaminated oil base drilling fluid containing an asphalt and a weighting material including slaked calcium oxide, which comprises adding to said drilling fluid sufficient unslaked calcium oxide to combine with substantially all of said water.

4. A non-aqueous drilling fluid comprising a mineral oil, a weighting material, and a substantial proportion of unslaked calcium oxide.

5. A non-aqueous drilling fluid comprising a mineral oil, an asphalt, a weighting agent including slaked calcium oxide and a substantial proportion of unslaked calcium oxide.

6. A light weight non-aqueous drilling fluid having a weight range of 68 to 90 pounds per cubic foot, comprising a mineral oil, a weighting material including slaked calcium oxide, an asphalt, and a substantial proportion of unslaked calcium oxide.

GEORGE MILLER.

Patented Apr. 20, 1943 **2,316,968**

DEFENDANT'S EXHIBIT B.

UNITED STATES PATENT OFFICE

2,316,968

OIL BASE DRILLING FLUID

George Miller, San Marino, Calif.

No Drawing. Application August 22, 1941,
Serial No. 407,905

4 Claims. (Cl. 252—8.5)

This invention relates to oil base drilling fluids of the type employed in oil and gas wells.

Oil base drilling fluids usually include, in addition to the oil base, a weight material, a material for providing plastering properties, and a material for providing the drilling fluid with gel properties. The material added to impart weight to the drilling fluid is in the form of a finely divided solid, such for example as crushed oyster shells, limestone, barytes, etc., which must be maintained suspended in the drilling fluid. Blown asphalts have been added to such oil base drilling fluids for the purpose of improving the plastering properties thereof. There has also been added to oil base drilling fluids so-called gel imparting agents, such as lamp black, magnesium oxide, calcium hydroxide, etc.

However, the oil base drilling fluids previously employed have proved unsatisfactory in many instances. I have discovered that the reason for the frequent unsatisfactory action of the oil base drilling fluids heretofore employed has been due to the failure of such drilling fluids to have incorporated the correct type of asphalt. The art has previously assumed that the sole function and purpose of the addition of asphalt to an oil base drilling fluid has been to impart desirable plastering properties to the drilling fluid, whereas I have found that the gel properties of an oil base drilling fluid are largely dependent upon the character of the asphalt employed. Unless the asphalt employed is of a character capable of contributing certain desirable gel properties to the oil base drilling fluid, a satisfactory drilling fluid can not be produced by the addition of auxiliary gel materials.

It is, therefore, the major object of the present invention to provide an oil base drilling fluid containing asphalt effective for imparting not only desirable plastering properties to the drilling fluid, but also effective for imparting to the drilling fluid satisfactory gel properties.

It has been heretofore appreciated that air blown asphalts impart better plastering properties to an oil base drilling fluid than steam refined asphalts. The blown asphalts heretofore employed, however, have not possessed the property of imparting to the oil base drilling fluid the desirable gel strength properties, particularly at high temperatures. For example, a drilling fluid previously employed containing air blown asphalt, usually considered satisfactory for its plastering properties, and lamp black as a gel agent possessed satisfactory gel properties only up to a temperature of 160° F. At higher temperatures, the weight material settled from the drilling fluid and the drilling fluid became unsatisfactory in use. I have discovered that by employing a better gel material, such as calcium hydroxide, the gel strength of such a drilling fluid can be made satisfactory up to a temperature of 200° F. However, the bottom hole temperature of many wells now being drilled is in excess of these temperatures and accordingly such oil base drilling fluids do not operate satisfactorily in such wells. In order to provide an oil base drilling fluid satisfactory for operation in wells having high bottom hole temperatures, it is necessary to employ in the oil base drilling fluid asphalt which will impart superior gel properties to the drilling fluid. It is not practical to use asphalt of insufficient gel strength and attempt to increase the gel strength of the resulting drilling fluid by the addition of increased quantities of settling inhibitors, such as lamp black, calcium hydroxide, or magnesium oxide. This is due to the fact that if the asphalt employed is weak in gel properties, one must add such a quantity of settling inhibitor to stabilize the drilling fluid at high temperatures that the gel strength and viscosity of the drilling fluid at low temperatures becomes too great for the use of the drilling fluid, and for the further reason that the addition of such quantities of settling inhibitors impair the plastering and deplastering properties of the mud fluid.

A part of the discovery of the present invention is that the gel strength of a drilling fluid containing asphalt as the plastering agent is governed in part by the melting point of the asphalt employed. Apparently, the gel strength of the drilling fluid becomes unsatisfactory whenever the drilling fluid is raised to a temperature close to the melting point of the asphalt employed. Thus, as far as I am aware, blown asphalts previously employed in drilling fluids have had melting points not exceeding 232° F., and such drilling fluids can not be made to retain suitable gel properties at temperatures above 200° F., and as ordinarily compounded have unsatisfactory gel strength at temperatures as low as 160° F. An oil base drilling fluid which has a satisfactory gel strength is one which will not settle out weight material or other ingredients if allowed to stand quiescent for a period of twenty-four hours. The term "satisfactory" also implies that the weight material or other ingredients must not settle out over a range of both low temperatures and at the highest temperatures expected to be encountered in a well;

furthermore, the gel strength must not be so high that the drilling fluid is not readily pumpable or free-flowing throughout the temperature range to be expected.

Accordingly, the present invention employs an air-blown asphalt having a high melting point, i. e., a melting point above 260° F., and preferably around 260–280° F. although asphalts having melting temperatures up to about 310° F., or higher, may be employed. The higher the melting point of the asphalt (within limits) the better the gel strength which will be imparted by that asphalt to the drilling fluid. Not all high melting point asphalts lend good gel strength, as some stocks when air-blown until they have a low penetration, i. e., from 0 to 5 at 25° C., impart little or no gel strength, while others may impart a satisfactory gel strength. The asphalt must be selected both from the standpoint of its melting point and its penetration. The penetration of a high melting point blown asphalt is normally lower than the penetration of the lower melting point asphalts. Ordinarily, as the penetration of the asphalt decreases (between 8 and 0), its plastering properties decrease. The asphalt selected must, therefore, be one having a high melting point and also a satisfactorily high penetration. Many air-blown asphalts have too low a penetration at melting points of 260° F., or higher, to impart satisfactory plastering properties to a drilling fluid. By selection of stocks and by proper blowing technique (well-known to the oil refiner), it is possible to produce asphalts having penetrations around 8 to 14 with melting points around 275 to 260° F., and of a rubbery nature, which asphalts I regard as the most suitable for the purposes of the present invention. Where the drilling fluid is to be used at extremely high temperatures, it may be preferable to use even higher melting point asphalt, and thus I include in the asphalts usable for the purposes of the present invention asphalts having a penetration of from 6 to 14 and a melting point of 310 to 260° F., the higher penetrations being, of course, associated with the asphalts having the lower melting points.

A disadvantage of using an asphalt of too high a melting point is that during the operation of mixing the asphalt with the oil base of the drilling fluid, if the asphalt has too high a melting point and too low a penetration, it is difficult to cut the asphalt back with the required type of oil.

Where the drilling fluid is to be used with very high bottom hole temperatures, say a bottom hole temperature in the neighborhood of 350° F., even higher melting point asphalts than above indicated may be required. The use of air-blown asphalts derived by an air-blowing process having a very high melting point, such as above 350° F., usually results in a drilling fluid having unsatisfactory plastering properties, but very good gel strength. It is a part of the discovery of the present invention that certain natural asphalts lend very good plastering properties to oil base drilling fluids. On the other hand, natural asphalts lend little or no gel strength to the drilling fluid, although they usually have a high melting point and seldom have a penetration of over 2 or 3 at 25° C. By mixing natural asphalts, such as gilsonite, glance pitch, some types of grahamite, natural lake asphalts, etc., with certain high melting point air-blown asphalts, satisfactory plastering properties may be secured in a drilling fluid intended to operate at high temperatures. Thus, whenever a drilling fluid is to be added to a well having high bottom hole temperatures, say above 280° F., the proper melting point air-blown asphalts for use at such high temperatures may have insufficient plastering properties, but a satisfactory drilling fluid may be derived by adding natural asphalt.

The precise reason why certain asphalts are capable of imparting to an oil base drilling fluid a suitable gel strength while other asphalts having the same melting point may be unsuitable is believed to be the difference in the quantity and form of the petrolenes and asphaltenes contained in such asphalts. The petrolenes consist of so-called asphaltic resins and oily constituents. According to some authorities, the asphaltenes are made up of particles of elementary carbon which absorb some of the petrolenes and are thus kept dispersed in the oily medium. Other authorities consider the asphaltenes to be hydrocarbons of high molecular weight—aromatic or hydroaromatic in nature—and the asphaltenes are assumed to be dispersed in the petrolenes or asphaltic resins. It is considered that it is the action of the petrolenes on the asphaltenes which will determine the elastic and plastic properties of the asphalt. When the ratio of petrolenes to asphaltenes is reduced as by air-blowing, the asphaltenes adhere to each other in a flocculated condition so that their free motion is impeded. When the asphaltenes are of the proper colloidal particle size, the asphalt is capable of imparting the desired plastering properties to a drilling fluid. If a given stock or residuum is blown long enough, the asphaltene content not only increases in quantity but also the asphaltenes increase in size. This tends to decrease the penetration of the asphalt and make the product harder. Thus, as the molecular or particle size of the asphaltenes increases beyond the colloidal size, the plastering properties decrease. It is, therefore, not true that all air-blown asphalts possess desirable plastering properties for oil base drilling fluids, since when the blowing process is continued far enough a point is passed where the plastering properties of the asphalt produced are at a maximum. The penetration or hardness or elasticity of a blown asphalt is chiefly due to the status of the petrolenes, which in turn determine the gel strength that such asphalt may impart to the drilling fluid. It, therefore, follows that in order to obtain the maximum plastering properties and the desired gel strength at high temperatures from a certain blown asphalt, the blowing process must be continued until a certain definite range is reached, and no further. It is well known that certain petroleum stocks tend to produce asphalts containing different quantities and qualities of petrolenes and asphaltenes than other stocks. Certain stocks when blown to produce asphalt produce asphalts having low penetration and also poor elastic or gel properties. Such stocks are unsatisfactory for the production of a drilling fluid for use at high temperatures, and it follows that in order to provide the correct asphalt for an oil base drilling fluid it is necessary, therefore, to select a stock which produces an aspahalt having a high penetration and rubbery or elastic nature and to air-blow such asphalt within correct melting point limits.

The constituents of an asphalt or the form of such constituents which govern the gel strength of the asphalt are susceptible to alteration. Thus, if the correct asphalt is heated above its melting point during the cut-back process, the gel strength of the resulting cut-back asphalt is impaired. Thus, a desirable oil base drilling fluid containing asphalt should never be subjected to a heat above the melting point of the asphalt used. Bottom hole temperatures of 240° F. have been reported in drilling practice, and, therefore, in accordance with the present invention the asphalt selected should have a melting point of at least 260° F., and preferably around 270 or 280° F. The gel strength of the asphalt can also be seriously affected by the employment of the wrong type of oil in the oil base drilling fluid. Oils containing material quantities of aromatic constituents are unsatisfactory since they tend to change the relationship between the petrolenes and asphaltenes and to dissolve the asphaltenes. I have discovered that a satisfactory oil base drilling fluid for use at high temperatures can only be produced by the use of a good refined oil, i. e., one relatively free of aromatics. Any good refined oil, such as absorption oil, Dieseline oil, or stove oil, is satisfactory, whereas many poorly refined distillates, Diesel fuels, crude oils, etc., are undesirable.

As an example of a drilling fluid embodying the present invention, I have produced satisfactory drilling fluids using 50% by weight of a refined stove oil, 33% by weight of ground oyster shells as weighting material, and 4% of calcium hydroxide as a settling inhibitor, with 13% of blown asphalt having a melting point of 303° F., and a penetration of 7 at 25° C. I have also produced satisfactory drilling fluids using the same proportions of ingredients, but substituting a blown asphalt having a melting point of 260° F., and a penetration of 11 at 25° C. In another example, the blown asphalt employed had a melting point of 270° F., and a penetration of 10. In another example, the blown asphalt employed had a melting point of 280° F., and a penetration of 9. All of such oil base drilling fluids possess desirable gel properties both at low temperatures and temperatures up to and exceeding 240° F.

Many other examples of the invention may be given. By adhering to the following rules, a satisfactory drilling fluid will be produced. The correct type of asphaltic bitumen should be used which will not only impart plastering properties but also gel strength when exposed to high temperatures. The allowable range for the air-blown asphalt used should be a melting point of 260° F. to 310° F., and a penetration of 14 to 6 mm. at 25° C. The correct type of settling inhibitor should be employed, such as calcium hydroxide. The correct type of oil for the suspending medium should be employed, such as a refined absorption oil or stove oil, or oil relatively free of aromatic constituents. The drilling fluid should not be heated to a temperature above the melting point of the asphalt employed.

The foregoing rules define the prerequisites of a satisfactory oil base drilling fluid employing air-blown asphalt. In certain cases, as previously pointed out, it may be desirable to add some natural asphalts. The melting point of most natural asphalts is fairly high, while the penetration of such asphalts may be as low as zero and up to 3. Whereas air-blown asphalts (produced from the correct stock) which have a high melting point and a low penetration possess good gel properties and inferior plastering properties, natural asphalts of the same melting point and perhaps an even lower penetration have good plastering properties and poor gel strength at high temperatures. By mixing natural asphalts and air-blown asphalts, satisfactory drilling fluids may be produced.

The invention is of the scope set forth in the appended claims.

I claim:

1. An oil base drilling fluid, comprising an oil, a finely divided weight material, a settling inhibitor, and an air-blown asphalt capable of imparting both plastering properties and satisfactory gel properties to the drilling fluid at temperatures in excess of 200° F., and having a melting point of 260 to 310° F. and a penetration of 14 to 6 at 25° C.

2. An oil base drilling fluid, comprising an oil substantially free of aromatic constituents, a finely divided weight material, calcium hydroxide as a settling inhibitor, and an air-blown asphalt having a melting point of 260 to 310° F. and a penetration of from 14 to 6 at 25° C.

3. An oil base drilling fluid, comprising an oil, a finely divided weight material, a settling inhibitor, and an air-blown asphalt having a melting point of 260° F. to 310° F. and a penetration of 14 to 6 at 25° C.

4. An oil base drilling fluid, comprising an oil, a finely divided weight material, a high melting point air-blown asphalt and a natural asphalt, said air blown asphalt having a melting point of 260° F. to 310° F. and a penetration of 14 to 6 at 25° C.

GEORGE MILLER.

Patented Aug. 29, 1944 **2,356,776**

DEFENDANT'S EXHIBIT C.

UNITED STATES PATENT OFFICE

2,356,776

COMPOSITION FOR PREPARATION OF OIL BASE DRILLING FLUID

George Miller, San Marino, Calif., assignor to Demont G. Miller, Los Angeles County, Calif.

No Drawing. Application June 16, 1942, Serial No. 447,298

5 Claims. (Cl. 252—8.5)

This invention relates to a composition to be used in the preparation of an oil base drilling fluid.

It is a general object of the present invention to provide a powdered mixture of materials which requires only the addition of a suitable oil base and a slight amount of water to produce an oil base drilling fluid of exceptionally satisfactory character.

An oil base drilling fluid should include, in addition to the oil base, a weight material, an ingredient or ingredients for providing plastering properties, and an ingredient or ingredients for developing the proper gel properties. In order to produce a suitable oil base drilling fluid, these several added ingredients must be properly distributed through the base.

The present invention provides a composition containing all of the ingredients necessary to add to an oil base in order to convert said oil base into a satisfactory oil base drilling fluid, and furthermore provides these ingredients in a form which facilitates and insures the production of an improved oil base drilling fluid.

It is usually desirable that an oil base drilling fluid have a weight range of between 68 and 90 pounds per cubic foot, and to provide the proper weight range the composition of the present invention includes a weight material, such for example as crushed oyster shells, limestone, barytes, etc. An oil base drilling fluid should also include a material to provide plastering properties to the drilling fluid, and for the purpose of providing such plastering properties the composition of the present invention includes asphalt. Preferably, the asphalt employed should be of the type described and claimed in my copending application, Serial No. 407,905, filed on August 22, 1941. As pointed out in said copending application, by the selection of the proper asphalt not only are desirable plastering properties imparted to the drilling fluid but the gel properties of the drilling fluid may be materially improved.

The bottom-hole temperatures of many wells now being drilled are in excess of 200° F., and in order to provide an oil base drilling fluid satisfactory for operation in wells having such high bottom-hole temperatures it is important to employ in the oil base drilling fluid an asphalt which will impart to the drilling fluid improvements in the gel properties of the drilling fluid. The gel strength of the drilling fluid containing asphalt as the plastering agent is governed in part by the melting point of the asphalt employed. becomes unsatisfactory whenever the drilling fluid is raised to a temperature close to the melting point of the asphalt employed. As a general rule, the penetration of asphalt decreases as its melting point is raised. As the penetration of asphalt decreases, its plastering properties decrease. As pointed out in said copending application, by careful selection of stocks and control of blowing technique it is possible to produce air-blown asphalts having penetrations of around 6 to 14 at 25° C. with melting points of 310 to 260° F., which asphalts are sometimes referred to as rubbery in nature, and asphalts of such character are preferably employed in producing the composition of the present invention.

The composition of the present invention also includes an additional agent which has in the composition a number of important functions. This additional ingredient is calcium oxide. Calcium oxide when slaked with water forms calcium hydroxide, which operates in the oil base drilling fluid produced by the use of the composition to act as an auxiliary gel-imparting ingredient. It thereby facilitates holding up the weight material of the drilling fluid and suspending the cuttings produced in the drilling operations. In this respect, calcium hydroxide is a superior reagent to any previously employed, particularly in that its gel-imparting properties are less susceptible to change upon change in temperature of the drilling fluid. The calcium oxide used in the composition of the present invention has, however, other important functions. By the use of an excess of calcium oxide over that which is to be initially converted into calcium hydroxide, the excess calcium oxide utilized imparts to the oil base drilling fluid automatic regeneration properties. During the use of an oil base drilling fluid it normally becomes gradually contaminated with water, and, as the water contamination in the drilling fluid gradually increases, it progressively loses many of its valuable properties. When the composition of the present invention includes an excess of calcium oxide, such excess of calcium oxide acts in the drilling fluid merely as additional weight material until there is a tendency of the drilling fluid to become contaminated with water. Any such water which may be picked up from the formation by the drilling fluid then reacts automatically with the excess or a part of the excess of calcium oxide to produce additional calcium hydroxide, thereby removing or preventing the water contamination of the drilling fluid and preerties of the original drilling fluid uncontaminated with excess water.

Finally, and of utmost importance to the composition of the present invention, is the function of the calcium oxide in the composition in facilitating the preparation of the drilling fluid. When water is added to calcium oxide, the calcium oxide reacts or slakes violently with the water, liberating a great deal of heat. The composition of the present invention utilizes in a most beneficial manner this property of calcium oxide.

In accordance with the present invention, the necessary ingredients for producing the most desirable form of oil base drilling fluid, i. e., a weight material, the correct type or types of asphalt, and calcium oxide, are prepared as an intimate powdered mixture, so that all that is required in order to produce an oil base drilling fluid is to add such powdered mixture to a suitable oil containing a small amount of water. The calculated quantity of water should be present in the oil in order to just combine with so much of the calcium oxide or the composition as is required to produce the calcium hydroxide intended to be included in the drilling fluid upon its initial production.

When the powdered composition of the present invention is added to an oil containing such a calculated quantity of water, the properties of the calcium oxide in slaking violently with the water and in liberating a great deal of heat greatly facilitate dispersion of the weight material and asphalt in the oil base drilling fluid and insure the dispersion of these ingredients in the most desirable manner. The utilization of this property of calcium oxide in slaking violently when brought in contact with water as a means of insuring dispersion of weight material and asphalt in an oil base drilling fluid have been found to very materially decrease the labor necessary in the production of an oil base drilling fluid.

The following are preferred examples of compositions embodying the present invention:

While various weight materials may be employed, I have employed in one example of the invention limestone as the weight material. The limestone is ground or powdered in any usual or preferred manner, the majority of the weight material being powdered separately from the powdering of the remainder of the ingredients. In a similar manner, the calcium oxide to be employed in the composition is separately powdered. The asphalt which is employed in the composition due to its high melting point and particular properties is also capable of being ground to a powder, for which purpose it may be ground, for example, in a hammer mill. In order to facilitate grinding of the asphalt in a hammer mill, a small proportion—say 10% by weight—of the weight material is added to the asphalt. After powdering these several ingredients in the manner described, they are then mixed together to form a powdered mixture. A preferred powdered mixture is one containing 66% by weight of the weight material or limestone, 26% by weight of the blown asphalt or mineral rubber, and 8% by weight of calcium oxide.

In order to produce an oil base fluid of such a powdered composition, I add, for example, to 100 parts by weight of the powdered composition approximately 100 parts by weight of a suitable oil base, such as stove oil or gas oil. I also add amount of water added is sufficient to combine with or slake about three-fourths of the calcium oxide employed and has the effect of insuring a rapid and complete dispersion of the weight material and asphalt in the stove oil or gas oil. The remaining excess calcium oxide of the composition serves to prevent or at least materially reduce the water contamination of the drilling fluid upon a subsequent utilization in a well-hole. The drilling fluid resulting from the use of this composition is capable of satisfactory operations in well-holes having bottom-hole temperatures in excess of 260° F. Where the drilling fluid is to be used at extremely high temperatures, it may be found preferable to utilize the following example of the invention:

As pointed out in the aforesaid copending application, it is very difficult, if not impossible, even by selection of stocks and careful air-blowing technique to produce air-blown asphalts having melting points, for example, above 350° F., which possess satisfactory plastering properties. On the other hand, certain natural asphalts having extremely high melting points contribute very satisfactory plastering properties to oil base drilling fluids, although not contributing or possessing any satisfactory gel properties. By mixing natural asphalts, such as gilsonite, glance pitch, some types of grahamite, natural lake asphalts, etc., with certain high melting point air-blown asphalts, a mixed asphalt is derived having both satisfactory plastering properties and gel properties, even when the drilling fluid is heated to high temperatures, say above 280° F. Accordingly, in the second example of the present invention, I grind together, for example, in a hammer mill with the addition of a small amount of weight material an air-blown asphalt and natural asphalt, and add this ground mixture to separately ground weight material, such as limestone, and to the separately ground or powdered calcium oxide in the proportions indicated in the first example, or in any desired or preferred proportions.

The invention is of the scope set forth in the appended claims.

I claim:

1. A composition for use in preparing an oil base drilling fluid, which composition consists of a powdered mixture of weight material, calcium oxide, and asphalt.

2. A composition for use in preparing an oil base drilling fluid, consisting of a powdered mixture of weight material, calcium oxide, and an asphalt, the asphalt having a penetration of from 6 to 14 and a melting point of 310 to 260° F.

3. A composition for the preparation of an oil base drilling fluid, said composition consisting of an intimate solid mixture of finely divided weight material, a high melting air-blown asphalt and a natural asphalt, and calcium oxide.

4. A powdered mixture for preparation of an oil base drilling fluid upon addition of the oil base, consisting of an intimate mixture of finely divided weight material, the air-blown asphalt having a penetration of 14 to 6 at 25° C. and a melting point of 260 to 310° F., a natural asphalt, and calcium oxide.

5. A composition of matter containing powdered limestone, powdered air-blown asphalt, and powdered calcium oxide in sufficient quantities to quickly disperse the powdered limestone and asphalt in an oil base containing a slight amount of water.

DEFENDANT'S EXHIBIT D.

Examiner's Statement.

July 31, 1947.

This is the Examiner's Statement as to the appeal from the final rejection of claims 1 to 7, all the claims now in the case. The amendment filed January 20, 1947, paper No. 8, which amended claims 1 to 7 and cancelled claims 8, 9, and 10, has been entered.

The claims on appeal are:

(Claims as in application, Plaintiff's Exhibit 1.)

The references relied on are:

Miller I	2,316,967	Apr. 20, 1943
Miller II	2,316,968	Apr. 20, 1943
Miller III	2,356,776 filed June 16, 1942	Aug. 29, 1944

Subject Matter.

This case relates to oil-base drilling muds. In drilling oil or gas wells by the rotary method a mud is pumped down the drill tubing to the drill bit, out through holes in the bit, and up in the annular space around the outside of the tubing to the surface. Cuttings are carried off by the mud, removed at the surface, and the mud pumped back to the tubing. In addition to carrying off cuttings the mud performs other functions among which one of the most important is plastering up the walls of the bore hole. Porous walls are sealed in this way so that liquid in the drilling mud does not penetrate into the formation. Ordinarily these muds are made of clay and water but sometimes it is desirable to use oil instead of water as a base for the mud. It is old to use muds made by mixing oil, a gelling agent such as a soap or asphalt, and a weighting agent such as calcium carbonate from oyster shells. Applicant proposes to use as the gelling agent certain natural asphalts such as gilsonite, manjak, glance pitch, and grahamite instead of the ordinary steam refined asphalt, which is a residue from petroleum refining. These natural asphalts yield a mud which has low fluid loss without at the same time thickening or gelling the mud excessively. The fluid loss is measured by a laboratory apparatus which gives an indication of the amount of liquid that will penetrate into the formation from the mud when the mud is circulated under high pressure into the well. This loss should be as small as possible, that is, the mud should seal the walls in such a manner that very little fluid from the mud gets into the formation. The thickening or gelling effect is measured as the "Gel Strength" and should be sufficient to keep the cuttings in suspension during circulation but low enough to allow them to settle out at the surface, low enough to allow easy pumping, and low enough not to entrain formation gases or air as a foam.

The Rejection.

All the claims stand finally rejected as being fully met by the Miller patents. All these patents disclose drilling muds containing weighting agents, suspending agents, an oil vehicle, and a natural asphalt. The Miller I patent shows the use of mineral rubber which is another name for gilsonite. In the Miller II patent the use of gilsonite, glance pitch and grahamite is specified (page 2, column 1, line 54, to column 2, line 8). The patents state that the natural asphalts are used for improving the plastering properties of the mud which means sealing the walls and implies reducing the liquid loss.

Applicant's main contention is that George Miller, the patentee in all three patents, derived the invention from applicant. Affidavits under Rule 75 have been submitted showing that George Miller was employed as a subordinate to the applicant and did certain work on oil base muds at applicant's direction and under his supervision. It has also been pointed out in arguments that Miller does not claim the invention of the present claims but more limited modifications of it. It has been suggested that this is because Miller knew he was not the inventor of the subject matter of the present claims.

These arguments would have certain weight in deciding priority between Miller and the applicant but they are not the only persons involved. The public has an interest to be protected. Miller disclosed to the public the subject matter which applicant is now claiming. Applicant wishes to withdraw this information from the public domain and appropriate it to himself for the period provided by the patent laws. In order to do so the provisions of Rule 75 must be complied with. This rule requires that applicant shall affirm facts showing a completion of the invention before the filing of the applications on which the patents issued. The affidavits presented are deficient in this respect. There are data sheets presented based on experiments performed by Miller for applicant. These data sheets give the viscosities, gel strengths, and fluid loss (60 minute throughput) of various oil-based muds containing different asphalts. There is no statement that any comparisons were made or that **applicant** drew any conclusions from this work done by Miller. No actual tests on oil wells were apparently made at this time. Therefore, no actual reduction to practice has been shown. Only use in a well could prove that these compositions were suitable for use as drilling fluids. Chittick v. Lyons, 1939 C. D. 768. It is significant that Miller submitted his report on this subject matter on March 17, 1941, that this report is alleged to constitute a completion of the invention, but that no application was filed by applicant until

April 17, 1944, which is subsequent to the issuance of the first two Miller patents. Since the affidavits are insufficient to antedate the references and no other argument sufficient to overcome the rejection has been presented, the claims are properly rejected as being fully met by these patents.

It is respectfully requested that the rejection of all the claims be sustained.

Respectfully submitted,

JRL/jrr Acting Examiner, Division 64.

Brnninga and Sutherland,
1004 Market St.,
St. Louis, Mo.

Received Aug. 2, 1947.

DEFENDANT'S EXHIBIT E.

Examiner's Reply, November 19, 1947.

To: The Board of Appeals.

On review and consideration of the brief in the above mentioned appeal, no further comments are deemed to be necessary.

Examiner, Div. 64.

DEFENDANT'S EXHIBIT F.

Decision of Board of Appeals.

May 21, 1948.

This is an appeal from the action of the Primary Examiner finally rejecting claims 1 to 7, inclusive, which are all of the claims remaining in the case.

Claims 1 and 5 are representative, and read as follows:

1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.

5. In the art of drilling wells by the employment of an oil-base drilling fluid, the process comprising, adding to the drilling fluid a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite in an amount sufficient to substantially reduce the filtration loss.

The references relied upon are:

Miller, (1)	2,316,967,	Apr. 20, 1943,
Miller, (2)	2,316,968,	Apr. 20, 1943,
Miller, (3)	2,356,776,	Aug. 29, 1944.

Appellant contends that the Rule 75 affidavits herein overcome the Miller patents. These affidavits show that appellant conceived the invention prior to June of 1941, and presumably after 1940, when George Miller, the patentee, was hired by Baroid Sales Division of National Lead Company. What appellant was doing relative to the invention described in the affidavits after "prior to June of 1941" does not appear.

Appellant contends that the mere lapse of time affords no basis for application of the Miller v. Hepburn doctrine. The rule in Interference cases is that an inventor must be continually diligent concerning the issue from his date of conception to the date of reduction to practice where the last date is subsequent to the reduction-to-practice date of his opponent.

In this case, we agree with the Examiner that appellant did not reduce his composition to practice, and that no diligence has been shown. See Ex Parte Donovan, 1890 C. D. 109.

Appellant contends that he cannot make Miller's claims. In that event, we do not see how the question of originality can be decided here ex parte in the absence of Miller. The question before us is whether the affidavits overcome the Miller patents.

We are satisfied that the Examiner was right in holding that the affidavits are insufficient. The Examiner's rejection was not based on the Mason v. Hepburn doctrine.

The Examiner has referred to the public interest in the Miller patents. See, in this connection, claim 6 of Miller (1), which is broad enough to include blown asphalt or mineral rubber (gilsonite), the latter being one of appellant's natural asphalts.

It seems to us, however, that claim 6 of Miller (1) is substantially appellant's invention, although broadly worded as to "asphalt". This Miller patent states that blown asphalt or mineral rubber may be used. As we understand the matter, "mineral rubber" is gilsonite. Claim 1 does not exclude other materials in the composition, in which case Miller (2) claim 4 is pertinent. This Miller patent discloses the Markush group stated in claim 1 and in both Miller patents the selected asphalt must have been added to the mud as stated in claim 5.

On the record, the Miller patents must be assumed to be valid. They cover exactly what appellant claims, that is, a well drilling fluid "containing" or "comprising" gilsonite or an asphalt . . . selected from the group consisting of gilsonite, glance pitch, and grahamite. See claim 4 of Miller (2) and lines 70-75, page 2 (left), of this patent.

We find no reversible error in the rejection of the claims.

The decision of the Examiner is affirmed.

In event of appeal, attention is directed to In re Boyce, 32 CCPA 718, 144 Fed. (2d) 896, 1944 C. D. 609, 568 O. G. 568, 63 USPQ 80, in regard to specifically including in the appeal notice all grounds of rejection in the Examiner's Statement not expressly overruled by the Board.

F. J. Porter,)
Examiner-in-Chief.)
V. I. Richard,) Board
Examiner-in-Chief.) of
C. F. Blakely,) Appeals
Examiner-in-Chief)
(Acting).

May 21, 1948.

THE STATUTE INVOLVED.

35 U. S. C. 63, R. S. 4915. Bill in equity to obtain patent. Whenever a patent on application is refused by the Board of Appeals or whenever any applicant is dissatisfied with the decision of the board of interference examiners, the applicant, unless appeal has been taken to the United States Court of Customs and Patent Appeals, and such appeal is pending or has been decided, in which case no action may be brought under this action, may have remedy by bill in equity, if filed within six months after such refusal or decision; and the court having cognizance thereof, on notice to adverse parties and other due proceedings had, may adjudge that such applicant is entitled, according to law, to receive a patent for his invention, as specified in his claim or for any part thereof, as the facts in the case may appear. And such adjudication, if it be in favor of the right of the applicant, shall authorize the commissioner to issue such patent on the applicant filing in the Patent Office a copy of the adjudication and otherwise complying with the requirements of law. In all cases where there is no opposing party a copy of the bill shall be served on the commissioner; and all the expenses of the proceedings shall be paid by the applicant, whether the final decision is in his favor or not. In all suits brought hereunder where there are adverse parties the record in the Patent Office shall be admitted in whole or in part, on motion of either party, subject to such terms and conditions as to costs, expenses, and the further cross-examination of the witnesses as the court may impose, without prejudice, however, to the rights of the parties to take further testimony. The testimony and exhibits, or parts thereof, of the record in the Patent Office when admitted shall have the same force and effect as if originally taken and produced in the suit. (R. S. sec. 4915; Feb. 9, 1893, ch. 74, sec. 9, 27 Stat. 436; March 2, 1927, ch. 273, sec. 11, 44 Stat. 1336; Mar. 2, 1929, ch. 488, Sec. 2 (b), 45 Stat. 1476; Aug. 5, 1939, ch. 451, sec. 4, 53 Stat. 1212.)

No. 11,008.

APPELLANTS' BRIEF.

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT.

DELMAR H. LARSEN, [redacted],
Appellants,
vs.
JOHN A. MARZALL, Commissioner of Patents,
Appellee.

United States Court of Appeals
For the
District of Columbia Circuit

FILED JUN 25 1951

Joseph W. Stewart
CLERK

Appeal from the United States District Court for the
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STATEMENT OF QUESTIONS PRESENTED.

(1) A question is, whether under Patent Office Rule 75, a showing of reduction to practice or diligence by a later applicant is necessary in order to antedate an issued patent, when the proof shows disclosure to the applicant of the patent prior to his filing date and who then was a coemployee of the same company subordinate to the later applicant?

(2) Another question is whether in the art of drilling wells by the employment of a drilling fluid, a procedure of testing such a drilling fluid in accordance with standard procedure as then practiced in that art, constituted a reduction to practice of the drilling fluid, and whether corroboration thereof is necessary under Rule 75?

(3) Another question is whether delay during wartime, in commercial use of the drilling fluid in actual well drilling or in filing the application, raised an inference that the test was not successful under the conditions of (1) or (2) supra, when there was no concealment, when there is no interference and when the application was filed less than one year before the issue of the patent relied on.

PREFACE.

The proceedings in the District Court, including the transcript at the trial and the exhibits, have been printed, and where printing was impractical, those parts have been photostated; the patents relied on by Plaintiff and by Defendant have been added. All that has been included in the Joint Appendix hereafter abbreviated as "App."; transcript as "Tr.", Plaintiff's Exhibits as "Pl. Ex.", and Defendant's Exhibits as "Def. Ex." All emphasis is ours.

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No. 11,008.

APPELLANTS' BRIEF.

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT.

DELMAR H. LARSEN, NATIONAL LEAD COMPANY,
a Corporation, Assignee,
Appellants,

vs.

JOHN A. MARZALL, Commissioner of Patents,
Appellee.

Appeal from the United States District Court for the
District of Columbia.

JURISDICTIONAL STATEMENT.

This is an action under R. S. 4915, 35 U. S. C. 63, to authorize the Commissioner of Patents to issue a patent to Plaintiff on the claims in suit.* After a trial in open court, briefs were filed, and the District Court, Judge Bailey, rendered an Opinion adverse to Plaintiff, App. 5, followed by Findings of Fact and Conclusions of Law, App. 7, etc., a Judgment Dismissing the Complaint, App. 12, and Plaintiff's Motion for a New Trial, App. 12, which was overruled, App. 19. Plaintiff, thereafter, filed this Appeal,

---

* After the filing of the Complaint, the application was assigned to National Lead Company, App. 25, Tr. 20, so that Company has been made a Co-Appellant.

App. 19. For convenience, Appellants will be referred to as Plaintiffs and Appellee as Defendant. Larsen will sometimes be referred to as Applicant, and Defendant sometimes as the Commissioner.

STATEMENT OF CASE.

The record in this case, outside of the proceedings in the District Court and summarized in the Jurisdictional Statement, supra, comprises the application in suit, the testimony of applicant Larsen and of Ratcliffe, the various exhibits corroborating Larsen, patents relied upon by Plaintiffs to show environment, patents relied upon by the Commissioner as prior art, the Examiner's Statement, the Examiner's Reply, which is simply an acknowledgment of the receipt of applicant's brief, and the decision of the Board of Appeals.

At this point, and in order to properly present the case, even though it may seem argumentative, we want to preliminarily note the following:

The questions before this Court are not the usual ones in an R. S. 4915 proceedings. That will appear from the Statement of Questions Presented, and successively more fully from the Statement of Points, the Summary of Argument, and finally from the Argument.

The Patent Office relied upon three Miller patents as disclosing applicant's invention. While we may assume for the purpose of this case that to be a fact, actually such is not the situation, as will appear subsequently when we discuss the question of non-interference between the application in suit and the Miller patents.

What applicant did was to antedate the filing dates of the Miller patents by Affidavits of applicant Larsen (and corroborated by Ratcliffe) under Patent Office Rule 75, as it then existed. Those Affidavits were filed, the last one in January, 1947, App. 94, and that rule was not recast as

Patent Office Rule 131 until March 1, 1949. The Patent Office Rule 75, as it existed prior to 1949, therefore, applies here. Rule 75 is relied upon in the Examiner's Statement, App. 173, and in the decision of the Board of Appeals, App. 176.

The question before this Court is then whether the testimony in this case with the corroborating Affidavits comply with Patent Office Rule 75. There is no other question before this Court.

We want to note here that, as in the Motion for a New Trial, App. 12, we only rely on claims 1-4.

Subject-Matter in Suit.

The application in suit, Pl. Ex. I, relates, as the title states, App. 76, to the:

> "Employment of Non-aqueous Well-drilling Fluids."

The invention relates to the art of drilling wells by what is known as the rotary system of drilling. While that system is generally described in the application, it is stated somewhat more fully in Plaintiff's opening statement, App. 22, etc., Tr. 5, etc.; and the Commissioner's counsel conceded that the explanation was sufficient so as to require no testimony, App. 25, Tr. 21. We will briefly summarize it:

In the rotary system of drilling, a drill pipe having a large bit at its lower end is rotated to bore down into the earth, making a hole larger than the pipe. In order to carry the cuttings to the surface, a drilling fluid is employed, which is pumped down the drill pipe, issues through holes in the bit and rises in the space outside of the pipe to the surface where the cuttings are settled or screened out.

An aqueous drilling fluid had as its base water with clay dispersed therein in order to thicken it, i. e., give it viscosity or gel strength in order to carry the cuttings out of the well without requiring a too high velocity, which might otherwise tear down the bore wall. The drilling fluid, however, also performs the function of walling or sealing the bore hole against water filtration into the formation, leaving the clay behind on and in the bore hole walls. Water-base drilling fluids, however, have the disadvantage that when a producing formation is encountered the water will go into the formation and "drown out" the oil, so that inflow of the oil into the completed well will be restricted and in fact prevented.

This case involves a non-aqueous or **oil-base** drilling fluid in which the liquid phase is oil. Such a drilling fluid was suggested as early as 1923, **Swann Patent** No. 1,455,010, App. 151. Such an oil-base fluid must, however, again have something to impart viscosity and sealing properties.

The viscosity property was attained by the use of lamp black, magnesium oxide, etc., while the sealing property was attained by the use of **an asphalt**, also mentioned in the Swann patent. It is, however, difficult to employ one material to accomplish both results, because something that will give high sealing properties, that is low filtration rate of the oil into the formation, may increase the viscosity or gelling effect beyond limits. That was conceded by the Examiner when he said in his Statement, Def. Ex. D, App. 172:

> ". . . This loss should be as small as possible, that is, the mud should seal the walls in such a manner that very little fluid from the mud gets into the formation. The thickening or gelling effect is measured as the 'Gel Strength' and should be sufficient to keep the cuttings in suspension during circulation, but low enough to allow them to settle out at the surface, low enough to allow easy pumping, and low enough not to entrain formation gases or air as a foam."

The above should be kept in mind in considering Larsen's invention and the tests which were performed by Miller under his direction and supervision.

About 1940 there came into use commercially a non-aqueous drilling fluid in which the fluid phase was oil, together with a material such as lamp black, magnesium oxide and calcium oxide, to impart gel characteristics, in order to attain the proper viscosity. **Air blown asphalt** was, however, used to seal the bore hole so as to prevent excessive infiltration of the oil into the formation, which would otherwise become lost.

Now the use of asphalt in an oil-base drilling fluid was quite old, going back to 1923, Swann Patent No. 1,455,010, supra, App. 151, acquired by Plaintiff, App. 23, Tr. 7, and discussed by Larsen, App. 57, etc., Tr. 75, etc. In 1940 the Dawson et al. Patent No. 2,223,027 issued to Shell Development Company, App. 153, and was cited during the prosecution of the Larsen and Miller applications, App. 58, Tr. 77. It was discused by Larsen, App. 58, Tr. 78, etc., as disclosing the employment of air blown asphalt, together with lamp black, also disclosed in the Miller patents, except that Miller discloses the use of a special air-blown asphalt and calcium oxide. In 1940 the Huissman Patent No. 2,220,681, App. 155, also issued to Shell and as discussed by Larsen, App. 60, Tr. 80, etc., it disclosed the use of magnesium oxide, an equivalent of calcium oxide disclosed by Miller, App. 60, Tr. 81. In 1940 the Henkes Patent No. 2,222,949, App. 157, also issued to Shell; it was discussed by Larsen, App. 61, Tr. 81, and again discloses the employment of lamp black. All the Shell patents issued in November, 1940.

It will, therefore, be seen that before 1941, when the earliest application of the Miller patents was filed, the use of natural asphalt, blown asphalt, lamp black and magnesium oxide, an equivalent of calcium oxide, all for use in oil base well-drilling fluids, had been disclosed. The use of natural asphalt, the best known of which was Trinidad Lake asphalt, App. 62, Tr. 83, was public property, because the Swann patent expired in 1940, when the series of patents issued to Shell. Shell, however, had obtained patents for the use of air-blown asphalt, lamp black and magnesium oxide alone and in combination with air-blown asphalt, all in oil-base drilling fluids.

The Larsen Application in Suit.

The Larsen application in suit discloses and specifically claims the employment in oil-base drilling fluids of a natural asphalt of a very specific type, specified in each claim in suit, App. 82, namely:

> "of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss."

As to that special class, the Examiner conceded, App. 172:

> "These natural asphalts yield a mud which has low fluid loss without at the same time thickening or gelling the mud excessively."

The above is based upon the specification, App. 80, which shows that gilsonite, manjak (glance pitch) and grahamite give a filtration loss which is "nil," that is, zero, at a gel strength imparting viscosity of "nil" or "slight."

On the other hand, App. 80, Trinidad Lake asphalt gives a filtration loss of 3.6, although at nil gel strength; steam refined asphalt gives a filtration loss of from 25 to 75, although at a nil or slight gel strength; air blown asphalt, while giving a nil or zero filtration loss gives a high, very high, or high medium gel strength. The above were confirmed by Larsen: as to Trinidad asphalt and steam refined asphalts, App. 45, Tr. 55-56, and as to air blown asphalts, App. 28, 43, Tr. 25, 50-51. Larsen showed, as to air blown asphalts, that a 3.6 filtration loss is quite different from zero, because in cubic milimeters, the difference is between 3600 and zero, and that the difference is substantial, App. 71, 74, Tr. 98 and 103.

As to Larsen's invention, he testified, App. 29, Tr. 27:

> "Q. Now, where you use your gilsonite, manjak and grahamite, what is the situation there? A. There the fact that the gilsonite and these other two materials will do nothing more or less than cut the filtration to zero, **allows greater control** because the filtration can be reduced to zero without particularly thickening the mud and then the mud can be thickened up separatedy by addition of some of these other agents that have that specific property.
>
> Q. In other words, you can use two agents independently and you can get at the filtration rate of zero and add a proper viscosity (controlling agent), is that right? A. That is right, you have **two variables** you want to control and by means of the invention concerned here, you have two different substances to effect changes in these two variables."

These other agents had been previously referred to, App. 27, Tr. 24, and enumerated in the specification, App. 77, namely: soaps, lime, etc., to impart plasticity, and barytes, oyster shells, etc., to impart weight. Slaked lime and oyster shells are used with the asphalts in the comparative tests in the specification, App. 80.

From the above it will be seen that Larsen's invention, involving the employment of gilsonite, etc., in an oil-base drilling fluid has the distinct advantage of attaining **zero filtration loss at a zero gel strength,** so that the gel strength, or viscosity can be brought up to any desired extent by the other agents just referred to, while still keeping the filtration at zero. On the other hand, while Trinidad Lake asphalt and steam refined asphalt give a zero gel strength, each has a high filtration loss; and while air-blown asphalts give a zero filtration loss, it also gives a high gel strength at that zero filtration loss; App. 46-47, Tr. 56-57.

We have called attention to the above, particularly for the purpose of showing that the employment of Larsen's gilsonite, etc., in drilling fluids has great utility which was recognized by the Patent Office. The Patent Office did not find that invention in any patent except in the Miller patents, which have been antedated by Larsen.

Larsen's invention is set forth in the claims relied on, App. 82, as follows:

> 1. "An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss."
>
> 2. "An oil-base well-drilling fluid, comprising a mineral oil vehicle and a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss."
>
> 3. "An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss, and a suspending agent of the character described dispersible in oil."
>
> 4. "An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss,

> and a weighting material of the character described dispersible in oil.''

The first claim is directed to the employment in an oil-base well-drilling fluid of a specific type or group of natural asphalts, which, as noted above, gives a zero filtration loss at a zero gel strength. The second claim specifies a mineral oil vehicle. The third claim specifies also a suspending agent, such as a soap, etc. The fourth claim specifies inclusion of a weighting material, such as barytes, etc., to impart high weight to the drilling fluid. Those additions are enumerated in the specification, App. 77. All of that is in accordance with Larsen's invention, in which the characteristics of plasticity and weight are imparted while still enabling the drilling fluid to attain a zero filtration rate.

In Plaintiff's Motion for a New Trial, App. 12, we only relied upon the first four claims, directed to a composition under R. S. 4886, 35 U. S. C. 31. We did not rely upon the last three claims, 5-7, directed to a process or art under R. S. 4886. That was done for the purpose of simplifying the issue, because the Supreme Court has made a distinction between a composition and a process as to what is required to constitute a reduction to practice; **Corona Company v. Dovan Company**, 276 U. S. 358, 383. We will again adhere to that position in order to simplify the issue, and we will rely only on the first four claims.

The salient facts as to Miller's association with Larsen and his assignee, Larsen's conception of the invention, and of the tests carried out, all prior to the earliest filing dates of the Miller patents, are set out substantially in the Findings of Fact 5, etc., of the District Court, App. 8, etc., except as to additional facts as they appear from the evidence and not disputed. We want to, however, note that Finding 2 does not state as to Larsen's invention the following specifically conceded by the Examiner, App.

172, when, after enumerating gilsonite, manjak, glance pitch, and grahamite, he says:

> "These natural asphalts yield a mud which has low fluid loss without at the same time thickening or gelling the mud excessively."

Miller's Association With Larsen and His Assignee.

Miller's association with Baroid Sales Division of National Lead and Larsen, is partially stated in Finding 5; however, it is desirable to state it more completely.

Patentee, Miller, came over to see Ratcliffe, the General Manager of Baroid, in April, 1940, in order to interest Baroid in an alleged Miller invention; Larsen, App. 34, Tr. 36; Ratcliffe, App. 50, Tr. 62. Ratcliffe thereupon made the letter agreement with Miller on April 16, 1940, Pl. Ex. 4, App. 102, which placed Miller on the payroll of Baroid as a chemist, and gave him an opportunity to test out Miller's idea at Baroid's expense, the letter providing that Baroid would pay Miller a royalty if his idea was acceptable. Thereafter Miller was placed on the Company payroll in June, 1940, but to work under Larsen's direction, and both were under Ratcliffe's direction, App. 37, Tr. 40, who was thoroughly capable by education and experience to understand all of the technical phases, App. 48, Tr. 59, etc.

Miller's idea was to use quicklime, that is calcium oxide, in connection with an air blown asphalt, App. 34, Tr. 36. Miller's application, Pl. Ex. 6, App. 106, was not, however, drawn by Baroid's attorney, but Mr. Ratcliffe wanted Miller to have his own attorney, App. 51, Tr. 63. That application, as prepared by another attorney, is for an oil-base drilling fluid comprising, App. 112, in addition to stove or gas oil and calcium carbonate or oyster shell lime, calcium oxide and blown asphalt or mineral rubber. Mineral rubber was, at that time, known as simply another name for air blown asphalt, Finding 3; in fact, mineral rubber was the name given to air blown asphalt sold by Union Oil Company, App. 38, 51, Tr. 43, 63, Pl. Ex. 7, App. 115, and even Miller's report, Pl. Ex. 8, App. 122. It is, therefore, not another name for gilsonite, as erroneously stated by the Examiner and by the Board, App. 172, 177.

In accordance with the letter agreement, Miller, App. 102, set to work to demonstrate his idea in accordance with the then practiced Standard Field Procedure, American Petroleum Institute, and Larsen saw those tests made, App. 41, Tr. 48, because he was then director of research for Baroid, App. 35, Tr. 37, and his office was next to the laboratory, App. 41, Tr. 48. The tests were, however, only with blown asphalt and calcium hydroxide, that is slaked lime, which was Miller's idea, App. 41, Tr. 46, 47, and as will also be seen from, Pl. Ex. 8, App. 117, Miller's report of January 31, 1941. That report was studied by Ratcliffe, App. 51, Tr. 64, and by Larsen, who, however, noted that while it gave zero filtration, the gel was rather high, App. 43, Tr. 50.

Now, in the meantime, the series of patents were issued to Shell Development Company, App. 153-157, as previously noted, and those covered the inclusion in an oil-base well-drilling fluid of air blown asphalts, the very thing which Miller asserted as his idea; and the inclusion of magnesium oxide, the equivalent of calcium oxide, another thing which Miller asserted as his idea. Of course, that precluded Baroid from going ahead with Miller's idea, particularly since it was the policy of Baroid not to infringe patents or to have a controversy with Shell, which was a good customer, App. 52, Tr. 65. Miller tried to prevail upon Ratcliffe to fight Shell, Pl. Ex. 9, App. 135, but Ratcliffe refused to do so, Pl. Ex. 10, App. 136. Accordingly, Mr. Ratcliffe surrendered the contract with Miller on April 16, 1941, Pl. Ex. 14, App. 150, but Miller retained his connection with Baroid by being sent out into the field servicing wells, App. 47, Tr. 58. Apparently, however, Miller proceeded with his applications, and even mentioned Larsen's gilsonite, etc., in his second and third applications, although that was done without the knowledge and consent of Larsen, App. 65, Tr. 89-90.

Larsen's Conception and Disclosure to Miller and Reduction to Practice.

With the situation as just shown, Larsen proceeded on his own. By education and experience with drilling fluids from the time of his graduation from California Institute of Technology, with a Master's degree and from his association with Baroid since 1936, rising to the position of Director of Research in 1940, App. 20, Tr. 20, Larsen investigated the problem personally, and hit upon three natural asphalts, namely: gilsonite, manjak (glance pitch) and grahamite, as being particularly suitable. Natural asphalts generally were then open to the public on account of the expiration of the Swann Patent No. 1,455,010 in 1940, so that there could be no conflict with the Shell patents, and soaps were not covered by the Shell patents.

Larsen, accordingly, wrote John H. Bruninga, the attorney for Baroid, on February 19, 1941, App. 137, disclosing the subject matter to him, with a copy to Ratcliffe, who saw it at that time, App. 52, Tr. 65. The District Court found, Finding 6, that the description was made and disclosed to Ratcliffe in February, 1941, and even to the patentee Miller during March, 1941. Further, Finding 7, that samples of these materials were ordered and received in February, 1941; the letters were filed in the Patent Office in support of Larsen's Affidavit under Rule 75, App. 86, etc.

The District Court found, Finding 7, that during March, 1941, Larsen directed patentee Miller to conduct laboratory tests of oil-base drilling fluids containing various proportions of gilsonite, manjak, glance pitch and grahamite in comparison with Trinidad Lake asphalt and steam-refined asphalt. Further, Finding 8, that Miller proceeded with such tests in accordance with Standard Field Procedure under Larsen's direction and under Larsen's observation, and reported the same in writing on March 17, 1941, which report was submitted to Larsen, and to Ratcliffe who at that time was skilled in this art. Those Findings are supported by Miller's report, App. 140, by Larsen, App. 45, Tr. 53, etc., and by Ratcliffe, who saw the report at that time, App. 49, Tr. 61, etc. While the report on the tests of Larsen's gilsonite, etc., was in comparison with Trinidad asphalt and steam-refined asphalt, Miller's previous report, App. 127, did show that while in some cases air blown asphalts attain zero filtration, it did not attain zero gel, but, as Larsen testified, rather high gel, App. 43, Tr. 50.

The tests were conducted in accordance with the Recommended Practice on Standard Field Procedure for testing drilling fluids theretofore established by American Petroleum Institute, Finding 8. That procedure is generally covered by Finding 9 as being standard practice at that time and actually employed at a well, because it is impossible to conduct tests inside a well. We want to, however, elaborate somewhat on those Findings 8 and 9 in that respect.

Pl. Ex. 2, App. 95, "Standard Field Procedure for Testing Drilling Fluids," is very brief and readily understandable. It was also briefly described by Larsen, who testified that it has been the practice for 15 years, actually used at the well, practiced at the well, and the only tests which can be made at the top of the well, App. 29, Tr. 28-34. It was also discussed by Ratcliffe, who testified that it has been standard procedure since 1938, is used practically universally, that it is the only way that filtration loss can be measured and that it is relied upon by the entire industry, App. 49, Tr. 60-62. That is also confirmed by an eminent engineer, Chaney, Pl. Ex. 3, App. 101.

The concluding part of Finding 9 reads as follows:

> "At that time drillers relied upon such tests conducted by laboratory apparatus outside of the well in order to determine the utility and functioning of a drilling fluid."

The concluding part of Finding 8 also finds as to those tests performed by Miller:

> ". . . such tests demonstrated that oil base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically zero filtration losses at low viscosities and gel strength and were superior to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt."

Findings 10 and 11 summarize that Larsen conceived the invention before the filing dates of the applications of the Miller patents and that Larsen was corroborated in that respect by Ratcliffe. Finding 12 is as follows:

> "12. Plaintiff Larsen did not carry out any demonstration of the invention by actual use of oil base drilling fluids, containing gilsonite, manjak, glance pitch or grahamite in a well."

However, the part of Finding 9 states:

> ". . . Such standard procedure was at that time conducted by drillers outside of the well by the apparatus recommended by the American Petroleum Institute even during the course of drilling a well, because it was impossible to conduct those tests at the bottom of the well or along the well bore."

Findings 13 and 14 are really in the nature of conclusions of law, as are also Findings 17 and 18, so they will be considered in the Argument.

Finding 15 states the situation as it existed in this country in March, 1941, when the tests were made by Miller under Larsen's direction, and to the filing of the application in suit on September 17, 1944. That is supported by the testimony of Ratcliffe, App. 52, etc., Tr. 66-73, and of Larsen, App. 66, etc., Tr. 91-94.

Finding 16 to the effect that three years delay in filing weakens the effect of the testimony in establishing reduction to practice will be taken up in Argument, as will also the opinion of the District Court.

The Miller Patents.

Findings 3 and 4 relating to the Miller patents do not state the entire situation. Larsen discussed these patents, App. 63, etc., Tr. 85-90. Actually, the Miller Patent No. 2,316,967, App. 161, is directed to the employment of calcium oxide, that is, lime, in connection with air blown asphalts; and although it mentions mineral rubber, as found by the Court in Finding 3, that is just another name for air blown asphalt. The Miller Patent No. 2,316,868, App. 165, while mentioning gilsonite, glance pitch, and some types of grahamite, they are used in combination with air blown asphalts to improve the plastering properties, while the air blown asphalt is relied upon to inhibit infiltration. The Miller Patent No. 2,356,776, App. 169, is to the same effect.

What obviously happened was that Miller included Larsen's gilsonite, etc., in his second and third applications after Miller's tests under the direction of Larsen. Larsen positively testified: App. 65, Tr. 89-90, etc., that Miller did not suggest the employment of gilsonite, manjak, grahamite, or glance pitch to him, but that he disclosed them to Miller (the District Court so found, Finding 6); further, that Larsen did not see the final draft of the first Miller application and did not see the applications of the second and third patents at all until after the patents issued; further, that although Miller was with Baroid for one year after he performed those tests in March, 1941, he did not tell Larsen that he was including gilsonite, etc., in his applications.

With further reference to Finding 3, Mr. Bruninga's statement at the conclusion of Mr. Miller's opening statement was as follows, Tr. 17-18:

> "Mr. Bruninga: I just want to say I do not admit that the Miller patents disclose what we disclose, but it is unnecessary, wholly unnecessary, to consider that at all because it is a case of prior art. Let us assume for the purpose of this case that Miller discloses what we claim and go from there. That is easier."

Bruninga then proceeded to show the court, that even on such an assumption, the Miller patents could be no statutory bars against Larsen for the reasons hereafter stated.

THE STATUTE INVOLVED.

The Statute involved is a familiar one, RS 4915, 35 U. S. C. 63; it has, however, been reproduced in the Appendix, page 179.

STATEMENT OF POINTS.

(1) The testimony adduced at the trial shows clear error by the District Court and on the part of the Patent Office in refusing a patent to Plaintiff with the claims in issue.

(2) The Miller patents constitute no statutory bars against Plaintiff.

(3) Patent Office Rule 75, not R. S. 4904, 35 U. S. C. 52, nor Patent Office Rules 93 and 94, controls here.

(4) Corroboration of Larsen by another witness was not necessary under Rule 75, but Larsen was corroborated by documentary evidence and by Ratcliffe.

(5) No reduction to practice or showing of diligence by Larsen was necessary in this case.

(6) Larsen's invention was actually reduced to practice in accordance with standard procedure then practiced in this art prior to Miller's filing dates.

(7) Reduction to practice by Miller under Larsen's supervision inured to the benefit of Larsen and his assignee.

(8) There is no interference between the Larsen application and the Miller patents, and the Miller patents do not even clearly disclose the Larsen invention.

(9) No inference adverse to Larsen's reduction to practice can be drawn because of Larsen's delay in filing.

(10) Plaintiff is entitled to a patent on the application in suit involving the claims thereof.

SUMMARY OF ARGUMENT.

(1) Under Patent Office Rule 75, no reduction to practice or diligence by the later applicant Larsen, or by his assignee, was necessary in order to antedate the Miller patents relied on by the Patent Office, because Larsen disclosed his invention to Miller prior to Miller's filing dates and Miller was then a co-employee of Larsen's assignee and subordinate to Larsen, and both were subordinate to Ratcliffe, the general manager and supervisor of Plaintiff.

(2) Corroboration of Larsen by another witness was not necessary to comply with Patent Office Rule 75, but Larsen was corroborated by documentary evidence and by Ratcliffe, the superior of Larsen and Miller, as to disclosure to him and, as to the result of the tests, prior to Miller's filing dates.

(3) The invention residing in a well drilling fluid was tested in accordance with Standard Field Procedure, then prescribed by the American Petroleum Institute and then practiced and relied upon by the art to establish utility and functioning, and such tests constitute a reduction to practice.

(4) The evidence establishes that Larsen conceived the invention, and it was disclosed to and reduced to practice by patentee Miller under Larsen's supervision, prior to Miller's filing dates, and those acts by Miller inured to the benefit of Larsen and his assignee.

(5) There is no interference between the Larsen application and Miller patents under R. S. 4904, 35 U. S. C. 52; that was conceded by the Commissioner's counsel, accordingly, Patent Office Rule 75 controls here. Further, the Miller patents do not even contain a clear disclosure of Larsen's invention.

(6) From March 19, 1941, when the invention was demonstrated in accordance with Standard Field Procedure A. P. A. to the filing of the Larsen application on April 7, 1944, Larsen and his assignee were engaged in defense work, and later in war work, and all their energies were directed to accellerating the production of oil by the supply of staple materials, and equipment for mining and preparing crude materials were not available.

(7) Larsen and his assignee did not conceal or abandon the invention because it was disclosed to Miller; there was an actual reduction to practice prior to Miller's filing dates, and Larsen's applications were filed within less than one year before the issue of the earliest Miller patent.

ARGUMENT.

In this case the Findings of Fact of the District Court, App. 7, etc., even though incomplete and in some cases erroneous, are such as to warrant a reversal of the District Court as a matter of law.

The District Court's Findings.

The District Court specifically found in Findings 6, 10, and 11, that Larsen conceived, described, and disclosed the invention to Ratcliffe and to the patentee Miller, before the filing dates of the applications of the Miller patents and that Larsen was corroborated by Ratcliffe and by documents in that respect. The District Court further found, Findings 5, 7, 8, and 9, that: at the time of the tests, before the filing of any of the Miller applications, Miller was assigned to and under the direct supervision of Larsen and to Ratcliffe, and that both were under the supervision of Ratcliffe; that Larsen actually directed Miller to conduct the tests; that the tests were actually so conducted in accordance with Standard Field Procedure; that a written report of the tests was submitted to Larsen, who was at that time skilled in that art; and that:

> "such tests demonstrated that oil-base drilling fluids containing gilsonite, manjak, glance pitch, and grahamite produced practically zero filtration losses at low viscosity and gel strength," Finding 8.

The District Court, however, found, Finding 13, that the laboratory tests were not sufficient to establish reduction to practice and "those laboratory tests were not corroborated by Ratcliffe who did not witness the tests." The finding, however, reiterated that Miller's written report "was submitted to and considered by Ratcliffe."

Finding 17 and Finding 12 that Larsen did not carry out any demonstration "in a well," when considered together probably mean that the District Court was of the opinion that a reduction to practice in this case could only be effectuated unless the demonstration is carried out in a well rather than outside a well, and that view appears in the Opinion, App. 6:

> ". . . At the trial the plaintiff's testimony that he conceived invention before the Miller patents was corroborated but his testimony as to having reduced it to practice before the dates of the Miller patents was not corroborated. He did testify as to certain laboratory tests and results, but did not show any reduction to practice by actual use in a well. In my opinion the laboratory tests would not be a sufficient reduction to practice, and even as to these tests his evidence is not corroborated."

However, tests for filtration were never carried on in a well, because it was impossible; and the District Court so found as to Standard Field Procedure, carried out by Miller under Larsen's direction; for Finding 9 specifically finds:

> ". . . Such standard procedure was at that time conducted by drillers outside of the well by the apparatus recommended by the American Petroleum Institute even during the course of drilling a well, because it was impossible to conduct those tests at the bottom of the well or along the well bore. At that time drillers relied upon such tests conducted by laboratory apparatus outside of the well in order to determine the utility and functioning of a drilling fluid."

From the above, it will be apparent that this is a case where the Findings of the District Court established a situation where, by the application of legal principles to the Findings, the question resolves itself into one of law. As will appear, and as brought out in Plaintiff's Motion for a New Trial, App. 12, etc., this case is different from other cases, in that the issues can be narrowed, even from a legal standpoint.

Patent Office Rule 75 Controls Here.

This case is controlled by Patent Office Rule 75, as it existed at the time the Affidavits were filed under Rule 75, the last one in January, 1947, App. 94. This case is not controlled by Patent Office Rules 93 and 94 promulgated under R. S. 4904, 35 U. S. C. 52, providing for interference proceedings and where the applicant and the patentee both claim the same invention; for the Commissioner's counsel specifically conceded the following:

> "Mr. Miller: I will concede you could not make the claims.
>
> Mr. Bruninga: And you concede there could not be any interference?
>
> Mr. Miller: I concede there could not be any interference.
>
> Mr. Bruninga: And Rule 75 applies?
>
> Mr. Miller: It is wholly a question of Rule 75" (App. 26, Tr. 22-23).

In this case, the District Court and the Patent Office have required the quantum of evidence necessary for a party to prevail in an interference proceeding, as distinguished from that required under Patent Office Rule 75. That was erroneous.

Patent Office Rule 75 of February 1, 1940, specifically provides for a method of antedating a patent **which does not claim** the subject-matter claimed by the applicant, for this rule specifically provides:

> "75. When an original or reissue application is rejected on reference to an expired or unexpired domestic patent which substantially shows or describes **but does not claim** the rejected invention, or on reference to a foreign patent or to a printed publication, and

> **the applicant** shall make oath to facts showing a completion of the invention in this country before the filing of the application on which the domestic patent issued, or before the date of the foreign patent, or before the date of the printed publication, and shall also make oath that he does not know and does not believe that the invention has been in public use or on sale in this country, or patented or described in a printed publication in this or any foreign country for more than one year prior to his application, and that he has never abandoned the invention, then the patent or publication cited shall not bar the grant of a patent to the applicant, unless the date of such patent or printed publication be more than one year prior to the date on which application was filed in this country."

Patent Office Rule 75 does not require any corroboration by another witness; indeed, that is the distinction between the requirements of the Rule and in an interference proceeding. The purpose of Rule 75 simply is to require an applicant to make out a prima facie showing of priority in order to overcome the prior art relied upon by the Patent Office. That is for the reason that under Rule 75 the patent antedated does not claim what the applicant claims. At any rate, the ruling of the Patent Office in the past, and even recently, has been that no corroboration is necessary; for in **Ex parte Leins**, a decision by the Board of Appeals of the Patent Office, 33 U. S. P. Q. 446, 447, the Board specifically states:

> ". . . An uncorroborated averment as to the date on which such construction was made has ordinarily been considered sufficient to meet the requirements of the rule. Under the rule, an affiant is required to establish only a prima facie case, and the only evidence necessary to satisfy the rule is evidence with respect to the construction alleged to have been made and averments as to other facts, such as diligence, which

> may be essential to establish a prima facie case of prior invention."

Even if the Patent Office Rule 75 by the expression "completion of the invention" means reduction to practice, still Larsen's affidavits, which he submitted to the Patent Office, App. 83, etc., and certainly his testimony before the District Court was sufficient to comply with Rule 75. The fact that Larsen went further before the Patent Office and submitted a corroborating affidavit of Ratcliffe, App. 92, and before the District Court produced Ratcliffe, who testified at the trial, neither of which was required by Rule 75, cannot affect the situation adversely to Larsen, but rather the reverse is true.

We are dealing here with a very special case, which is not an interference proceeding, but an ex parte proceeding involving the application of Patent Office Rule 75, which has a force of law. The District Court misconstrued that rule by ruling that corroboration of Larsen was necessary. That constitutes an error of law.

Ratcliffe Actually Corroborated Larsen as to the Tests.

Even if corroboration of Larsen's testimony was necessary, there was no lack of corroboration. The District Court said, Finding 13, App. 10:

> "those laboratory tests were not corroborated by Ratcliffe, who did not witness the tests."

The next sentence then continues:

> "Miller's written report dated March 17, 1941, was submitted to and considered by Ratcliffe."

Finding 8 also specifically found:

> "said written report of said laboratory test was submitted to Ratcliffe who was at that time skilled in the art of oil-base drilling fluids."

Let us again briefly review the facts, some of which are in the Findings, and as to some, we will refer to the evidence.

Ratcliffe was at the time of the tests the General Manager of Baroid Sales Division and by education and experience he was fully familiar with the art of well-drilling; Ratcliffe had hired Miller to work on oil-base drilling fluids in April of 1940 to work out an idea that Miller had for employing lime and blown asphalts for such purpose and he knew that Miller was so working on the idea, because he saw Miller's reports, Pl. Ex. 8, on that idea, App. 50-51, Tr. 62-65. It was then found that Shell had obtained patents on that very idea, and the contract with Miller was later cancelled, App. 52, Tr. 66, App. 150. Accordingly, Ratcliffe was fully familiar with what was going on in the laboratory and naturally so.

Ratcliffe saw Larsen's letter of disclosure of February 19, 1941, Pl. Ex. 11, the same day or the next day, and he paid attention to it, App. 52, Tr. 65-66; again that was natural so that Ratcliffe again became familiar with what Miller was doing under Larsen's direction. After Miller proceeded with the test of Larsen's invention under Larsen's direction, which the District Court found was in March, 1941, Findings 9 and 10, App. 9, Ratcliffe got a copy of Miller's report of that test at that time, App. 49, Tr. 61. Ratcliffe testified, App. 49-50, Tr. 61-62:

> "Q. What was the practice at Baroid Sales Company, were matters like that reported to you? A. Yes, all matters of this nature, of course, came to me practically immediately.
>
> Q. Now, in your opinion, was that **a practical demonstration** of those various natural asphalts mentioned in there? A. Do you mean that I could tell from here that those worked or just exactly——
>
> Q. Yes, whether they worked in drilling fluids as far as filtration? A. **Yes, we can tell from the test**

> **whether these materials will work in drilling mud.** You see, you can tell on practically everything but chemicals. When we first started out, we were not so sure what results we were going to get when we made the test in the laboratories and then correlated that with the use of the product in a particular well. But as time went on and prior to the time we standardized on these tests, it was pretty generally acknowledged that if you made these tests on the mud, you were pretty sure you knew what was going to happen in the well, you didn't need to actually try it in a well."

Ratcliffe could so testify, not only because he was familiar with what Miller had done in testing his own idea on the employment of blown asphalts and lime, but because he was fully familiar with the Standard procedure employed by Miller in both tests, App. 49, Tr. 60-61.

This is not a case where a witness called to corroborate an inventor was just an outsider or even one connected with the same company. This is a case where, as found by the District Court, both Larsen and Miller were under the supervision of Ratcliffe, Finding 5, App. 8, where Ratcliffe kept his hand on the throttle on what was going on in the laboratory and where he received copies of Miller's report on his test with blown asphalts and on his test under the direct supervision of Larsen on Larsen's invention. This case is a familiar one of the Necessity Principle, discussed by **Wigmore on Evidence,** 1904 edition, Vol. II, p. 1887, etc. Wigmore gives three reasons for circumstantial guarantee of trustworthiness, p. 1889, the third one of which applies particularly here, when the Author says:

> "(3) If, in addition to this, the entrant makes the record under a duty to an employer or other superior, there is the additional risk of censure and disgrace from the superior, in case of inaccuracies,—a motive

> on the whole the most powerful and most palpable of the three."

While the principle has been regularly applied to entries made in the regular course of business where a superior can testify as entries made by an inferior, Wigmore states, p. 1890:

> "There is, therefore, no special limitation as to the nature of the occupation."

The Commissioner may, of course, say that Miller could have been called as our witness. But we answer, what could we have expected Miller to say, when without the knowledge and consent of Larsen or of Larsen's assignee, he included Larsen's gilsonite, glance pitch, manjak and grahamite in his second and third patents, along with air blown asphalt, which latter he knew had been developed by Shell Oil Company, and when he tried to get Ratcliffe to take proceedings to break the Shell patent, which Ratcliffe refused to do, App. 135-136, App. 52, Tr. 65.

We submit that Ratcliffe corroborated Larsen as to the tests, which indeed the District Court found were actually made, Findings 8 and 9, App. 9.

No Reduction to Practice or Showing of Diligence by Larsen Was Necessary.

This is not an ordinary case of priority between independent inventors, but it involves a case of originality. As specifically found by the District Court, Findings 5-9, Larsen disclosed his invention to the patentee, Miller, while Miller was employed by Larsen's assignee to conduct tests under the direct supervision of Larsen and he did so. All that took place during March, 1941, and before the earliest Miller application of any of his patents was filed (June 24, 1941, App. 161). The fact that Miller thereafter mentioned Larsen's gilsonite, glance pitch and grahamite in his second and third patents, can certainly not prejudice Larsen or his assignee; for Miller was an interloper who was attempting to reap where he did not sow; in fact, where Larsen had sowed.

In such case the dates are of little importance, and it was so specifically decided in two cases, one by this Court and the other by the Court of Customs and Patent Appeals. While those were interference cases where there was actually a contest of claims, surely the principles apply to a situation as here, where the second and third Miller patents, even if describing Larsen's invention, do not claim it.

Browning v. Johnson, 50 App. D. C. 394, 1921 C. D. 203, reversed the Commissioner. The facts in that case were very similar to what we have here, except that it involved an interference. Browning made a drawing in 1897 and disclosed to Johnson in 1905, but Browning did not reduce to practice until 1907, **10 years later.** Johnson filed in 1906, while Browning did not file until 1908—11 years after his conception. The Court in awarding priority to Browning said, page 204:

> "It will be observed that we are here dealing with long periods of time."

After giving the above dates the Court said, page 205:

> "But these dates are of little importance, since the case turns upon the single question of originality. Was Johnson an original inventor, or did he derive the invention from Browning?"

Finally the Court said, page 205:

> ". . . Unless we are to discredit by the wholesale competent witnesses who stand unimpeached, this record overwhelmingly discloses that Johnson derived the invention from Browning. Hence, neither he nor his associates are entitled to benefit from the monopoly conferred by the patent.

> "This disposes of the case since neither Johnson nor his assignee is in position to charge Browning with lack of diligence, laches or estoppel by public use, as has been attempted. The decision is reversed."

Riney v. Thomas, 77 F. 2d 525, C. C. P. A., involved an interference in which the Decision of the Patent Office was reversed. Riney conceived in January, 1930, and through one Gustin Riney's invention was disclosed to Thomas who thereupon proceeded to make improvements and actually reduced the invention to practice which was, however, held to inure to the benefit of Riney, as stated by the Court as follows, page 527:

> ". . . However this may be, the proof is ample in the record that prior to Thomas' date of filing Riney had conceived the protector in question, had disclosed it to Thomas, and that it had been fully reduced to practice by Thomas, at Riney's request and as a result of said disclosure. We hold that this reduction to practice inured to Riney's benefit."*

The Court held, page 528:

> "Being of the opinion that Riney was the inventor of the subject matter of the issue, and that he conceived and disclosed the same to appellee Thomas, and that it was reduced to practice as hereinbefore stated long prior to Thomas' filing date, it follows that the decision of the Board of Appeals should be reversed and priority be awarded to the party Riney. This will be the order."

The District Court did not pass upon that question at all, although it was raised at the trial, Tr. 18, again in Plaintiff's brief before the District Court, and again in Plaintiff's Motion for a New Trial, App. 12, 16. Here again the District Court erred on a question of law.

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* To the same effect is Braunstein v. Holmes, 30 App. D. C. 328.

Larsen Actually Reduced His Invention to Practice.

Larsen actually reduced his invention to practice. As we have previously noted, and as we did in Plaintiff's Motion for a New Trial, App. 12, we have narrowed the issues in this case to the drilling fluid claims 1-4, as distinguished from claims 5-7 directed to the process. The broadest claim 1 reads as follows:

> "1. An oil-base drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss," App. 82.

It will be noted that claims such as Claim 1 are directed to a composition under R. S. 4886, 35 U. S. C. 31, while Claims 5-7 are directed to an art or process under that statute. Now the law has made a distinction as to what is necessary to complete an invention; that is, what is necessary to constitute a reduction to practice after conception. That was made clear by the then Chief Justice Taft in **Corona Co. v. Dovan Co.**, 276 U. S. 358, 383, as follows:

> ". . . A process is reduced to practice when it is successfully performed.
>
> "A machine is reduced to practice when it is assembled, adjusted and used.
>
> "A manufacture is reduced to practice when it is completely manufactured.
>
> "A composition of matter is reduced to practice when it is completely composed.
>
> "It is a mistake to assume that reduction to use must necessary be a commercial use," p. 384.

From the above it is clear that in order to constitute a reduction to practice of a process, it is necessary that it be successfully performed; but when it comes to **a composition**, it is only necessary that it be **completely composed.** The latter is again illustrated by the Corona-Dovan case involving vulcanized rubber containing a particular vulcanizing agent. The following tests were approved by the Supreme Court as constituting a reduction to practice of that vulcanized rubber:

> ". . . The fact of a successful 'cure' for practical purposes is established by a simple and short method called the thumb and tooth test. By this test, rubber chemists settle the fact and determine by the resulting product the satisfactory quality of the stock or the mix for vulcanization and they become experts at it," p. 367.
>
> "Kratz's method of testing his rubber slabs is criticized. As already said, it is the method known as the thumb and tooth test. This is not so exact a method in determining all the qualities that a test machine would show in the product, but it is, as already said, one very generally used for practical purposes in factories in determining that the vulcanization or cure is complete," p. 384, App. 13-14.

It is respectfully submitted that this case is a stronger case than was the Corona-Dovan case; for in this case the Standard Field Procedure for testing drilling fluids, Pl. Ex. 2, App. 95, is not simply a test upon which the industry relies, but it is the only test which can be made in order to determine the filtration rate, that is the passage of the liquid oil phase of the drilling fluid into the formation. That is, indeed, settled by the District Court's Finding 9, based upon the evidence as previously shown.

Certainly if "it was impossible to conduct those tests at the bottom of the well or along the well bore," how could the District Court possibly find that there was no reduction to practice because Larsen did not carry out any demonstration "in a well," Finding 12? This case is certainly more favorable than the Corona-Dovan case, where the thumb and tooth test was held sufficient to make out a case of reduction to practice for vulcanized rubber composition, even though additional actual use of rubber of that composition under service conditions was possible and not impossible as here inside of a well bore.

Finding 8 also specifically finds that the test was performed in accordance with Standard Field procedure, and finally that such tests

> "demonstrated that oil base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically zero filtration losses as low viscosities and gel strength and were superior to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt."

As we have shown previously, and as will be seen from the table in the specification, App. 30, Larsen's composition gave "nil," that is zero filtration rates with nil or slight gel strength, while Trinidad Lake asphalt and steam refined asphalt gave high filtration rates; and air blown asphalts, while giving nil or zero filtration rates that was only with high, medium high, or very high gel strengths. All that was amply supported by Larsen's testimony as to the Larsen composition, App. 29, Tr. 27; as compared with air blown asphalts, App. 28, Tr. 25; and with reference to Trinidad and steam refined asphalts, App. 46, Tr. 56-57 and App. 62, Tr. 84.

Surely Findings 8 and 9 establish reduction to practice in this case as a matter of law.

In the concluding part of Finding 15, App. 10, 11, the Court finds:

> "Miller's report dated March 17, 1941, of the laboratory tests were submitted to Ratcliffe, but at no time prior to the filing dates of the Miller application did Larsen tell anyone that the results of the laboratory tests convinced him that he had discovered a suc-

> cessful well drilling fluid of the character specified in the claims at bar."

Larsen specifically testified as follows:

> "Q. Now, as far as the tests that Miller performed, what was your opinion of those, were they successful or not successful? A. You mean all of the tests taken as a whole?
>
> Q. Yes, I mean the tests, Plaintiff's Exhibit No. 13, this particular test of gilsonite, manjak and grahamite. A. **I thought it was quite successful,**" App. 66, Tr. 90-91.
>
> "Q. Now, Mr. Larsen, when you had these tests made by Mr. Miller, you stated, did you not, that you thought the results of these tests were very satisfactory, you made that statement, did you not? A. I thought so and I still think so.
>
> Q. Did you tell that to anyone, or did you just keep it in your mind? A. Well, I don't remember, but I would suppose that I did mention it," App. 71-72, Tr. 98-99.
>
> "Q. And although you thought there was an improvement and although you thought possibly it solved the problem, you did not tell anybody about it? A. Oh, I think, I don't remember whom I might have told, but I am willing to believe that I did discuss it with my superiors," App. 72, Tr. 99.

The concluding part of the District Court's Finding 15 is, therefore, not supported by the evidence, but is contrary to the evidence. Mr. Ratcliffe testified:

> "Q. Now, in your opinion, was that a practical demonstration of those various natural asphalts mentioned in there? A. Do you mean that I could tell from here that those worked or just exactly——
>
> Q. Yes, whether they worked in drilling fluids as

> far as filtration? A. **Yes, we can tell from the test whether these materials will work in drilling mud,**" App. 49-50, Tr. 61.

Larsen's reduction to practice is clearly established by the Corona-Dovan case. It is also established by the decisions of this Court in the following cases: Mason v. Hepburn, 13 App. D. C. 86, 1898 C. D. 510, involved a magazine clip for firearms which was made and attached to a gun, but the gun was never fired with the clip on it, p. 510; nevertheless, this Court held that constituted a reduction to practice, p. 513. Lederer v. Walker, 39 App. D. C. 122, 1912 C. D. 560, involved a lacquer or varnish, which was carried out in the laboratory, but was held a reduction to practice, pp. 555, 556.

Rogers v. Willoughby, 55 App. D. C. 65, 1 F. 2nd 824, involved a special kind of loop antennae designed for use in submarines. No actual test in a submarine was made but the Court says, pp. 831-832:

> "On the facts of this case we are unwilling to hold that Rogers was bound to make tests of his conception 'under actual service conditions,' or to hold that a test made on a simulated submarine could not under any circumstances or state of facts be accepted as a reduction to practice. We are fully aware of the rule that to constitute a reduction to practice the test must be made under service conditions or on an instrumentality or utility in practical use. That rule, however, **has no application where it is impossible for the inventor to make his tests under service conditions,** or where because of government control and the pledges to the government of his representative enrolled in the Navy the inventor is denied information as to the experiments actually made. To hold otherwise would put the original inventor at a distinct

> disadvantage with government officials and employees, who entered the field later, and who could reduce their conception to practice under service conditions."

That case is closely analogous to this case, because neither Larsen nor his assignee were in the business of drilling oil wells and could only try it out with the consent of an oil company; apart from the fact that these tests performed at an oil well would be performed exactly in the same manner by laboratory experiments carried on outside of the well.

Sinko Tool & Mfg. Co. v. Automatic Corp., 157 F. 2nd 974, C. C. A. 2, involved the now well-known cigar lighter as used on automobiles. The question was one whether the tests would actually have to be so carried out. Judge Learned Hand reviewed the decisions and including those of the Supreme Court, of the Court of Appeals for this circuit and in other circuits and states his conclusions as follows, p. 977:

> ". . . Although in many later decisions the question has arisen of the need of a test under service conditions, it has never been laid down as an inexorable condition in all circumstances; the courts have again and again upheld inventions not so tested. Nor has this been confined to chemical cases; it has extended to all sorts of inventions: we annex in the margin a collection of some of the decisions with a description of the article involved. The doctrine to be drawn from the books, as we read them, is this—and incidentally it is the only doctrine that can find support in reason: a test under service conditions is necessary in those cases, and in those only, in which persons qualified in the art would require such a test before they were willing to manufacture and sell the invention as it stands."

Chittick v. Lyons, 104 F. 2d 818, C. C. P. A., cited in the Examiner's Statement, does not support the Examiner at all. That case involved a lubricant and in that case there was no official laboratory method but the only test recognized that was performance in service, p. 820, right. Such was not the case here at all. Indeed, the Court of Appeals recognizes the following:

> "That laboratory tests may constitute reduction to practice, under some circumstances, is so well settled that citation of authorities upon that point is deemed unnecessary. Such tests, however, must simulate actual service conditions with sufficient clearness to render it reasonably certain that the subject matter will perform its intended function in actual service."

The Examiner's Statement Is Conflicting.

The Argument in the Examiner's Statement, App. 173, etc., is conflicting. He says:

> "The affidavits presented are deficient in this respect. There are data sheets presented based on experiments performed by Miller for applicant. These data sheets give the viscosities, gel strengths and fluid loss (60 minute throughout) of various oil-based muds containing different asphalt."

These data sheets, App. 89, 91, submitted with Larsen's affidavit are those from Miller's report to Larsen and Ratcliffe, App. 145, 147, which show a comparison of Larsen's gilsonite, etc., with Trinidad asphalt, while the additional sheet, App. 149, shows the behavior of steam refined asphalt; so that "comparisons" were actualy made of "different asphalts." The Examiner had conceded, App. 172, as to Larsen's gilsonite, etc.

> "These natural asphalts yield a mud which has low fluid loss without at the same time thickening or gelling the mud excessively."

That is in agreement with the District Court's Finding 8, App. 9, that such tests demonstrated that oil-base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically zero filtration losses at low viscosities and gel strength, and were superior to oil-base drilling fluids containing Trinidad asphalt or steam refined asphalt. The Examiner, however, says, App. 172:

> "No actual tests on oil wells were apparently made at this time."

But the Examiner had conceded, App. 172:

> "The fluid loss is measured by a laboratory apparatus which gives an indication of the amount of liquid that will penetrate into the formation from the mud when the mud is circulated under high pressure into the well."

That again is in agreement with the District Court's Finding 9, App. 9. The Examiner, however, says, App. 173:

> "There is no statement that any comparisons were made or that **applicant** drew any conclusions from this work done by Miller."

Applicant could and did draw his conclusions from those tests and he so testified. Ratcliffe could do so and did as he testified. So could any one skilled in the art as Larsen and Ratcliffe testified. That the Examiner did so, is apparent from the above quotations. The fact is, as Larsen testified, he not only instructed Miller as to conducting the tests, but that he was present in the same laboratory and observed such tests.

The Standard Field Procedure, Pl. Ex. 2, already showed the purpose of these tests and what was to be accomplished. The invention was completed when the tests were made under Larsen's direction and in his presence. The invention did not even reside in any "conclusions" drawn by an observer, but in the results following the performance of the physical acts.

It is respectfully submitted that the District Court's Finding 17 that Plaintiff did not establish reduction to practice, which is really a Conclusion of Law, is not supported by the evidence, but is contrary to the evidence. By the application of the law laid down by the Supreme Court, by this Court and by other Courts, to the facts as set out in the District Court's findings, reduction to practice was established as a matter of law.

The Miller Patents Neither Claim Nor Disclose Applicant's Invention.

We have in this case the additional factor that the Miller patents themselves show that Miller did not consider himself the inventor of what applicant discloses and claims.

As previously noted at the very outset, the Commissioner of Patents conceded, App. 26, Tr. 22, that there could not be any interference between the application in suit and the Miller patents, and that the question is wholly one of the application of Patent Office Rule 75.

Miller Patent 2,316,967 simply discloses the employment of blown asphalt or mineral rubber (which latter is simply "another name for air blown asphalt," Finding 3, App. 7-8) in connection with calcium oxide or calcium oxide alone. That is what is specifically claimed in the Miller patent, App. 163; Larsen so testified, App. 64, Tr. 87, and that testimony was not disputed.

Miller Patent 2,316,968 is directed to the employment of an air blown asphalt having a high melting point, i. e., a melting point between 260° F. and 310° F. and a penetration of from 6 to 14, App. 166, left, lines 5, etc., and 43. That is what is specified in every one of the claims, App. 167, right. Larsen testified that the Miller patent relates to a particular type of blown asphalt, App. 64, Tr. 87-88. Claim 4, however, specifies the use in combination of that special air blown asphalt, "a natural asphalt." Larsen testified that that meant Trinidad Lake asphalt or other natural lake asphalts, App. 65, Tr. 88. However, the Miller patent states as to his special asphalts, App. 166, left, line 10:

> "The higher the melting point of the asphalt (within limits) the better the gel strength which will be imparted by that asphalt to the drilling fluid."

As to the natural asphalt, the patent states, App. 166, left, line 66:

> "On the other hand, natural asphalts lend little or no gel strength to the drilling fluid, although they usually have a high melting point and seldom have a penetration of over 2 or 3 at 25° C."

The patent then continues:

> "By mixing natural asphalts, such as gilsonite, glance pitch, some types of grahamite, natural lake asphalts, etc., with certain high melting point air-blown asphalts, satisfactory plastering properties may be secured in a drilling fluid intended to operate at high temperatures."

From the above, it will be seen that Miller simply mentioned gilsonite, manjak, glance pitch, and grahamite with natural lake asphalts; however, as noted above, the natural asphalt is claimed in Claim 4, App. 167, in combination with Miller's special air blown asphalts. Miller's whole idea was to cover a combination which would have a high gel as well as be an infiltration preventor; his idea was not to use Larsen's idea of gilsonite, manjak, glance pitch, and grahamite, having a zero gel at zero filtration loss.

Miller Patent 2,356,776, like the first patent, claims, App. 170, right, calcium oxide in combination with an asphalt, or Miller's special asphalt, or a natural asphalt, or an air-blown asphalt. Here again, the patent states, App. 170, right, line 26:

> "By mixing natural asphalts, such as gilsonite, glance pitch, some types of grahamite, natural lake asphalts, etc., with certain high melting point air-blown asphalts, a mixed asphalt is derived having both satisfactory plastering properties and gel properties, even when the drilling fluid is heated to high temperatures, say above 280° F."

Miller again simply mentions gilsonite, glance pitch, and grahamite, together with natural asphalts and natural lake asphalts. Larsen's testimony, App. 65-66, Tr. 88-90, to the above effect was not disputed by the Commissioner's counsel, although Larsen was cross-examined, App. 69, etc., Tr. 94, etc.

We have given the above discussion for the purpose of showing that Miller did not claim nor even describe Larsen's invention as stated in the claims, App. 82. The Examiner in his Statement argues, App. 173:

> "Miller disclosed to the public the subject matter which applicant is now claiming. Applicant wishes to withdraw this information from the public domain and appropriate it to himself for the period provided by the patent laws."

Actually, the first sentence is not correct, as we have shown above; second, neither Miller nor the public will be deprived of what the Miller patents claim after the expiration of the Miller patents. Applicant is not claiming the employment of calcium oxide (lime) slaked or unslaked, nor any air-blown asphalt, nor Miller's special air-blown asphalt, nor any of those in combination with any asphalts, nor with any natural asphalts, nor with any natural lake asphalts. Applicant is simply claiming the employment of the very special group of natural asphalt consisting of gilsonite, manjak, glance pitch, and grahamite, which give zero filtration loss at zero gel strength; Miller never attempted to cover those to substantially reduce the filtration loss, but to simply supplement his air-blown asphalt. The Miller patents do not even disclose Larsen's invention as described and claimed by him.

Further, as to Miller's actions in including Larsen's special type of natural asphalts, namely, gilsonite, manjak, glance pitch, and grahamite in his patents, the following observation of Judge Holtzoff in 93 Fed. Supp. 131, 133, is pertinent here:

> "Property rights in an unpatented secret process are circumscribed and limited. The owner of such a process has a right not to have the secret made public by theft, by bribery or stealth, or by breach of a confidential relation, such as that of an employer and employee. The person who obtains the secret in such an illegal manner commits a tort. So long as the secret remains intact, any one who invades it is guilty of a tortious act."

It certainly would constitute a miscarriage of justice to deprive Larsen and Plaintiff of this invention, because of Miller's breach of confidential relations in disclosing gilsonite, etc., in his patents without the knowledge and consent of Larsen or Plaintiff. There can be no statutory bar against Larsen and Plaintiff under R. S. 4886, 35 U. S. C. 31; for the Larsen application was filed within one year of the issue date of the earliest Miller patent.

The Board of Appeals Decision Was Clearly Erroneous as to Facts and Law.

The Board of Appeals decision, App. 176, etc., was clearly erroneous as to the facts and as to the application of the law to the facts.

The Board says, p. 177:

> "Appellant contends that the mere lapse of time affords no basis for application of the Miller (Mason) v. Hepburn doctrine" (13 App. D. C. 86).

But later the Board says:

> "The Examiner's rejection was not based on the Mason v. Hepburn doctrine."

The Board did, therefore, not pass upon any question of concealment nor abandonment.

The Board, however, says:

> "Appellant contends that he cannot make Miller's claims. In that event, we do not see how the question of originality can be decided here ex parte in the absence of Miller."

The Commissioner's counsel at the trial, however, conceded, App. 26, Tr. 22-23, that there is no interference and that patentee Miller is not even a proper party. Patent Office Rule 75 makes no distinction between the question of originality or non-originality, where the patentee "does not claim the rejected invention."

The Board further says, p. 177:

> "The Examiner has referred to the public interest in the Milier patents. See, in this connection, Claim 6 of Miller (1), which is broad enough to include blown asphalt or mineral rubber (gilsonite), the latter being one of appellant's natural asphalts."

That statement is erroneous in two respects: **First,** mineral rubber is not gilsonite, but is simply "another name for air-blown asphalt," Finding 3, App. 7 and 8. **Second,** Claim 6 of the first Miller patent, App. 163, right, does not simply claim asphalt or mineral rubber, but:

> "an asphalt, and a substantial proportion of unslaked calcium oxide."

The Board has wholly disregarded the difference between a combination of elements and an element, even though mineral rubber be gilsonite, which it is not.

The Board next refers to the second Miller patent and comparing it with applicant's Claims 1 and 5 states, App. 177:

> "As we understand the matter, 'mineral rubber' is gilsonite. Claim 1 does not exclude other materials in the composition, in which case Miller (2) Claim 4 is pertinent. This Miller patent discloses the Markush group stated in Claim 1 and in both Miller patents the selected asphalt must have been added to the mud as stated in Claim 5," p. 177.

Here again, the Board is in error; first, in again making the mistake that mineral rubber is gilsonite; second, Claim 4 of the second patent, App. 167, is not for a natural asphalt per se, but again for a combination comprising:

> "a high melting point air-blown asphalt and a natural asphalt, said air-blown asphalt having a melting point of 260° F. to 310° F. and a penetration of 14 to 6 at 25° C."

Here again the Board confuses a combination with one of its elements.

The Board is also in error when it states as to the Miller patents, p. 178:

> "They cover exactly what appellant claims, that is, a well-drilling fluid 'containing' or 'comprising' gilsonite or an asphalt . . . selected from the group consisting of gilsonite, glance pitch, and grahamite."

The above shows such clear error as to both facts and law; that the decision of the Board, like the Examiner's Statement, can be given very little weight. The District Court did not support the Board's decisions in the above respects at all, but the Findings of Fact are directly contrary to the Board's decision.

The District Court's Finding 16 Was Erroneous Legally.

The District Court found:

> "16. The fact that plaintiff Larsen waited for three years before filing his application weakens the effect of his testimony in establishing reduction to practice of the subject-matter of the claims in suit."

The District Court's Finding 16 involved a conclusion of law rather than a finding of fact. However, we want to call attention to the following as heretofore argued:

(1) This case is one of originality, so that no reduction to practice by Larsen was necessary. Browning v. Johnson, 50 App. D. C. 394, supra; Riney v. Thomas, 77 F. 2d 525, C. C. P. A., supra.

(2) Larsen actually reduced his invention to practice, Corona Co. v. Dovan Co., 376 U. S. 358, supra; Mason v. Hepburn, 13 App. D. C. 86, supra; Laderer v. Walker, 39 App. D. C. 132, supra; Rodgers v. Willoughby, 55 App. D. C. 65, supra; Sinko v. Automatic Corp., 159 F. 2d 974, C. C. A. 2, supra.

(3) Under Rule 75, corroboration of Larsen was not necessary either as to conception or reduction to practice; ex parte Leins, 32 U. S. P. Q. 46, supra, Board of Appeals. Here, however, Larsen was corroborated by Ratcliffe and documentary exhibits as to both conception and reduction to practice.

(4) We will now show that mere delay in filing, in the absence of concealment as against adverse rights, does not raise an inference unfavorable to the applicant.

Finding 15, App. 10, shows what happened after March, 1941, when the tests were completed, to April 17, 1944, when the application was filed, and that Finding is fully supported by Ratcliffe, App. 52-55, Tr. 66-70, and by Larsen, App. 66-69, Tr. 91-94.

If there ever was a case where delay in commercializing or in filing an application was excusable, this is the case. This Court will remember that as early as March, 1941, the resources of this country were being mobilized for Defense, apart from lend lease, which was then in effect. Pearl Harbor was bombed in December of that year, and when this application was filed our ships were still being sunk and our naval, land and air forces were literally crying for oil. At that time Baroid Sales Division of National Lead Company was the leader in furnishing materials for use in drilling. Ratcliffe testified, App. 52-54, Tr. 66-68:

> "Q. Now, that is in March that that test was made. The application was not filed until 1944. Of course, we all know from 1941 to 1945 we were engaged in war. How about the Baroid Sales Division, what position did they occupy as the supplier of materials for use in drilling fluids, were they pre-eminent or just a small factor? A. No. We have been leaders in that business for many years and during the war, oh, I suppose that we handled possibly 75 or 80 percent of all the materials. As petroleum is very important, we imported materials and sold them at cost and did everything we could to help the war effort out. We were very shorthanded, of course.
>
> Q. You were shorthanded, why? A. Well, most of our service engineers, of course, all our laboratory men, are college graduates and most of them were young fellows who had graduated, a lot of whom had graduated from military schools, schools that have military training. I think the first month we lost about thirty of our best men right off the bat. They were taken into the Army.
>
> Q. Those were not all laboratory men, were they? A. No, laboratory men, executives.
>
> Q. Was the great mass of your technical men, what was it at that time, outside the laboratories or in the

> field? A. They were college-trained chemical engineers.
>
> Q. And was that a large or a small proportion of your technical men? A. Oh, a very high proportion.
>
> Q. And those men had to go out and apply the things to the well? A. That is correct.
>
> Q. Well, from March, 1941, to April, 1944, were you being pushed to supply materials to the oil well builders (drillers)? A. Yes, as I said before, we had to get materials. Everybody was short because they wanted more and more oil and we had to get materials any way we could.
>
> Q. Did you have to buy materials? A. We had to buy it. We built plants, imported some from Cuba, some from Canada and all over.
>
> Q. Did you have plants of your own to make the materials? A. Yes, we do.
>
> Q. Now, in the case of this kind, where it is a very nice thing, maybe, but it is not essential, what was your experience in the oil-well drilling industry during that period? Did they fool around with requirements like that to get them into use or did they take the standard stuff during the war years of 1941 to 1944? A. Of course, they took what was available.
>
> Q. Yes. And was much experimenting done there on that line? A. No, practically dropped all research work during that period."

Sinko v. Automatic Corp., 152 F. 2d 974, C. C. A. 2, has been previously referred to as involving the well-known cigar lighter as now used on automobiles and which was tested, but not on an automobile under service conditions. That was **during the depression years.** The application was not filed for four and one-half years after the test, but the defendant in that case relied upon the fact that the delay in filing, as well as in commercializing raised an inference that the test had not been successful. The Court says, pp. 976-977:

> " . . . It is true that Sinko did not file his application for four and a half years thereafter, but the boards acquitted him of suppressing his invention until he had been 'spurred into activity' by Johnson's application; and he had certainly not abandoned it. His explanation for the delay was that the year 1933 was not favorable to new and untried ventures, nor were several of the years that followed. It is indeed true that he might have filed an application, for he was apparently an indefatiguable patentee; but **we cannot see what inference is to be drawn from his failure to do so**, except that he may have thought the invention of less importance than it afterwards proved to be. At any rate, delay alone is irrelevant except as basis for the inference that the machine had not been finally perfected; an inference which the evidence dispels. The case really comes down to this: whether, although the invention had been enough tested by persons exceptionally competent in the field, to satisfy them that it was ready for production, and although it in fact went into very extensive production substantially as it was, it was not 'reduced to practice' in 1933 because it had not been tested on an automobile."

Mason v. Hepburn, 13 App. D. C. 86, 1898 C. D. 510, supra, involved a case of actual concealment. The following statements of the Court are pertinent:

> "Considering, then, this paramount interest of the public in its bearing upon the question as presented here, we think it imperatively demands that a subsequent inventor of a new and useful manufacture or improvement who had diligently pursued his labors to the procurement of a patent in good faith and **without any knowledge of the preceding discoveries of another shall,** as against that other, who has delib-

> erately concealed the knowledge of his invention from the public, be regarded as the real inventor and as such entitled to his reward." p. 516.
>
> "Unless another in the meantime has made the same invention, and secured by patent the exclusive right to make, use and vend the patented improvement. Within that rule and subject to that exception, inventors may delay to apply for a patent." p. 516.

In that case not only the rights of the public, but the rights of the other inventor were involved, who had **no knowledge** at all of what was being done by the first inventor. Such is not the case here, because Miller was fully familiar with Larsen's prior conception as well as reduction to practice.

Lederer v. Walker, 39 App. D. C. 122, 1912 C. D. 560, supra, was a decision by Judge Shepard, who also rendered the decision in Mason v. Hepburn. Walker's conception and reduction to practice was in 1901, but he did not file his application until 1905. The Court deciding in favor of Walker distinguished from Mason v. Hepburn as follows:

> ". . . Mason v. Hepburn was a case of deliberate secretion of an invention after its reduction to practice, for about seven years, during which interval another, **without knowledge of the work of the first inventor**, conceived the same invention, and procured a patent for it. The first inventor was stirred to activity by the knowledge of the latter's patent," p. 562.

The Court after discussing other cases following Mason v. Hepburn says:

> ". . . In each of those cases there was a deliberate suppression of the invention for different periods, during which another **independent inventor** entered the field and reducing the invention diligently to practice, introduced it to the trade. The first inventor was in

> each instance stirred to activity by the knowledge of his rival's successful exploitation of the invention," p. 563.
>
> "Later, apprehending that there was a disposition to give the doctrine of Mason v. Hepburn a wider scope than was justified, the court took occasion to say that the rule of that case 'will not be extended to any case not coming clearly within it' (McBerty v. Cook, C. D. 1900, 248; 90 O. G. 2295; 16 App. D. C. 133)", pp. 563-564.

There can be no statutory bar against Larsen under R. S. 4886, 35 U. S. C. 31, for the Larsen application was filed within one year of the issue date of the earliest Miller patent.

In Seeberger v. Russell, 26 App. D. C. 344, 1906 C. D. 612, there was a delay of two and one-half years in filing the application. The Court of Appeals, however, in reversing the Patent Office says:

> ". . . There was some delay in applying for a patent, it is true, but this is also insufficient to destroy the weight of the proof of actual reduction to practice. No change was made—certainly no material one—in the device of the original construction . . ."

That there is no burden of diligence to file an application following reduction to practice, is also affirmed by the following decisions: **Brydle v. Honigbaum,** 54 F. (2d) 147, 149, C. C. P. A. That was also the view of the C. C. P. A. in **Bowers v. Valley,** 149 F. (2d) 284, 287, and in Sinko v. Automatic Corp., 157 F. (2d) 974, 976-977, C. C. A. 2. That is not only because an inventor's rights are established by reduction to practice, but because public policy prefers an actual reduction to practice as distinguished from "constructive" reduction to practice by the filing of an application. **Laas et al. v. Scott,** 161 F. 122, E. D. Wisc.; **Clancy v. DeJahn,** 36 F. (2d) 131, 133, C. C. P. A.

The above decisions certainly establish that Larsen's mere delay in filing, in the absence of concealment and as against adverse rights, does not raise an inference unfavorable to the applicant. Larsen certainly did not conceal his invention, because he disclosed it to Miller, who had a competing idea. Miller was certainly not an independent inventor who proceeded without knowledge of the work of Larsen, but the reverse is true. The delay in commercializing cannot raise an inference adverse to Larsen and his assignee, who had the best reasons in the world for delay in proceeding with a new venture requiring mines and equipment, when their loyalty to their country required that they use what they had.

Conclusion.

It is respectfully submitted that the District Court, as well as the Patent Office, were in error in refusing to grant to Plaintiffs a patent on claims 1 to 4, the only ones now in issue. It is, therefore, respectfully submitted that the District Court should be reversed and that the Commissioner of Patents be authorized to issue a patent on those claims.

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BRIEF FOR APPELLEE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

APPEAL NO. 11008

DELMAR H. LARSEN, APPELLANT

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA

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United States Court of Appeals
for the District of Columbia
Circuit

FILED SEP 10 1951

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CLERK

Appeal No. 11008

STATEMENT OF QUESTION PRESENTED

In the opinion of the appellee, the primary question is whether the District Court was right in dismissing the complaint seeking the allowance of claims 1 to 7 inclusive of the application for patent in suit, the answer to this question being in turn dependent upon whether appellant has satisfactorily shown that he completed the invention of the claims in suit prior to the effective date of the reference patents, the patents to Miller, upon which the claims in suit have been held to read.

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United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

APPEAL NO. 11008

DELMAR H. LARSEN, APPELLANT

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

COUNTERSTATEMENT OF THE CASE

The District Court declined to authorize the allowance of claims 1 to 7, inclusive, of the application for patent in suit, holding (Joint Appendix, page 6) that "At the trial plaintiff's counsel conceded that for the purposes of this case the subject matter of the claims at bar is disclosed in the Miller patents, Nos. 2,316,967, 2,316,968, and 2,356,776," and further holding in Finding of Fact 17 (Joint Appendix, page 11) that "Plaintiff has not established any reduction to practice of the subject-matter of the claims in suit before the effective date of the Miller patents."

On the foregoing state of facts, the claims in suit are prima facie not patentable to appellant over the disclosures of the Miller patents, and appellant may overcome the prima facie case only by showing that he completed the invention of the claims in suit prior to the effective dates of the Miller patents. The issue before this Court is, then, whether the District Court was right in holding that appellant had not satisfactorily proven that he had completed the invention prior to the effective dates of the Miller patents.

SUMMARY OF ARGUMENT

1. This case involves no question of interference or of originality.

2. The Miller patents are a prima facie bar to appellant to a patent on the claims in suit.

3. The prima facie bar of the Miller patents can be overcome only by a satisfactory showing by appellant that he completed the invention of the claims in suit prior to the effective dates of the Miller patents.

4. An invention is not completed until it is both conceived and reduced to practice.

5. Appellant proved no satisfactory reduction to practice.

6. Whatever tests appellant did make of the subject matter in suit were not properly corroborated so as to be available as a reduction to practice, even though such tests, had they been properly corroborated, might have been held to be a reduction to practice.

7. The long delay after appellant's alleged reduction to practice in doing anything at all with the invention casts doubt on the convincingness of the alleged successful reduction to practice.

8. The finding of the District Court that the claims in suit are not patentable to appellant over the patents to Miller is a reasonable finding on the evidence presented, and therefore such finding should not be set aside in the absence of clear proof of error.

ARGUMENT

1. At the outset, it seems well to point out that this case involves no question of interference. Appellant correctly points this out at page 18 of his brief under point (5) of his summary of argument. In other words, there is no question of priority as between appellant and Miller as to subject matter claimed by both. The claims of the Miller patents are not the claims in suit, although the specifications of the Miller patents do disclose the subject matter of the claims in suit.

Thus the District Court properly observed (Joint Appendix, page 26) that "I must say it is difficult for me to understand how this Court could determine priority of invention between the applicant and Miller without Miller being before the Court." The question here, however, is not who first made the invention of the claims in suit, but merely whether appellant completed that invention before the filing date of the Miller applications. That question can be determined without the presence of Miller before the Court.

Notwithstanding that appellant argues at page 44 of his brief that "This case is one of originality * * *," it is respectfully submitted that the question of originality is not in the case. The matter of originality arises in an interference when the question is whether one of the parties to the interference derived the invention in issue from his opponent.

As just pointed out, there is no issue of interference in the instant case. Appellant and Miller are not claiming the same subject matter. The controversy arises about subject matter which Miller discloses in his patents. Where Miller derived this subject matter from, whether from appellant, from some one else or from Miller himself is of no importance here. The disclosed subject matter, regardless of who invented it, stands disclosed in the patents, and is a bar to a patent to a later applicant, unless the later applicant can prove that he completed the invention prior to the effective date (filing date) of the patent. The case at bar is accordingly respectfully submitted to raise no question of originality at all.

It is clear from mere inspection that the applications for the Miller patents (Joint Appendix, pages 161 to 170) were filed long before the application here in suit was filed on April 17, 1944 (Plaintiff's exhibit 1, Joint Appendix, page 76), which was *after* two of the Miller patents had actually been issued. It is the filing date of the application resulting in a patent, and not the date of issuance of the patent, which establishes the effective date of the patent as a reference against a later filed application, for subject matter disclosed therein, even although not claimed therein. *Alexander Milburn Co.* v. *Davis-Bournonville Co.,* 270 U. S. 390.

Although appellant makes the point in the section of his brief at page 38 that "the Miller Patents Neither Claim nor Disclose Applicant's Invention," it is immaterial that these patents do not claim the subject matter in suit. If they disclose it, they are valid references, without a claim to the subject matter.

Minerals Separation North American Corporation v. *Magma Copper Co.,* 280 U. S. 400.

Appellant's arguments to the effect that the Miller patents do not disclose the subject matter in suit seem rather pointless after the concession before the District Court, referred to in the Memorandum Opinion (Joint Appendix, page 6) that "At the trial plaintiff's counsel conceded that for the purposes of this case the subject matter of the claims at bar is disclosed in the Miller patents * * *," and Finding of Fact No. 4 (Joint Appendix, page 8) based thereon.

Briefly, it is apparent that the whole point of appellant's case rests on the use of gilsonite, manjak, glance pitch or grahamite in the well drilling fluid. See claim 1 in suit referred to and reproduced in the Memorandum Opinion (Joint Appendix, page 5) as a typical claim. Even appellant's own brief (page 39) in discussing the disclosure of the Miller patents concedes that "* * * Miller simply mentioned gilsonite, manjak, glance pitch, and grahamite * * *." The mention of these substances is obviously in connection with their use in a well drilling fluid.

In view of the foregoing, it seems unnecessary to state anything further as to the clear readability of the claims in suit upon the Miller patents. If the claims in suit do not read upon the Miller patents, the refusal of the claims in suit upon those patents was bad for that reason alone, and it was unnecessary for appellant to make any showing that he completed the invention of the claims in suit before the effective dates of the Miller patents.

3. The Miller patents not claiming the subject mat-

ter in suit, appellant was at liberty, under the practice of old Rule 75 of the Patent Office, to show, if he could, that appellant completed his invention before the date of filing of the application resulting in the Miller patent. This appellant attempted to do by affidavit under Rule 75. The Board of Appeals held the showing insufficient. (Joint Appendix, pages 176 to 178). The District Court found in Finding of Fact No. 17 (Joint Appendix, page 11) that "Plaintiff has not established any reduction to practice of the subject-matter of the claims in suit before the effective date of the Miller patents."

4. An invention is not completed until it is both conceived and reduced to practice. *Petersen* v. *Thomas*, 56 App. D. C. 113, 10 F. 2d 908. Here it is conceded that appellant had a conception of the subject matter of the claims at bar prior to Miller's filing date in the Patent Office. See Finding of Fact No. 10 (Joint Appendix, page 9). It is also conceded that plaintiff's testimony as to conception was corroborated. See Finding of Fact No. 11 (Joint Appendix, page 9).

5. The controversy here is as to whether appellant proved a satisfactory reduction to practice. Appellant contends that certain tests made by Miller inured to appellant's benefit, and established reduction to practice by appellant prior to the filing date of any of the applications resulting in the three Miller patents hereinbefore referred to as constituting the basis for refusing the claims in suit to appellant. It is the position of the District Court, agreeing with the position of the Patent Office tribunals, that appellant proved no satisfactory reduction to practice. Finding of Fact No. 17 (Joint Appendix, page 11).

It is conceded here that tests by Miller, whatever such tests were worth, inured to the benefit of appellant. It was the position of the District Court, however, that the laboratory tests carried out by Miller under appellant's directions were not sufficient to establish a reduction to practice. Finding of Fact No. 13 (Joint Appendix, page 10).

The examiner in the Patent Office held (Joint Appendix page 173) that "no actual reduction to practice has been shown" because "no actual tests on oil wells were apparently made at this time." The District Court held, in Finding of Fact No. 12 (Joint Appendix, page 10) that "Plaintiff Larsen did not carry out any demonstration of the invention by actual use of oil base drilling fluids, containing gilsonite, manjak, glance pitch or grahamite in a well."

Appellant apparently concedes that the ruling of the District Court was correct as to process claims, such as 5 to 7, inclusive, of the claims at bar, since it is said at page 3 of appellant's brief that "We want to note here that * * * we rely only on claims 1-4." Claims 1-4 are not process claims, but for a well drilling fluid containing a natural asphalt of a certain type and character including one of gilsonite, manjak, glance pitch or grahamite, in amount sufficient to substantially reduce the filtration loss.

In view of appellant's argument at page 30 of his brief to the effect that "A composition of matter is reduced to practice when it is completely composed," it seems to be appellant's position that less in the way of proof is necessary to establish reduction to practice of a mere composition of matter. However, this Court is not required to pass upon whether appellant's mere production of a composition of matter including one of gilsonite, etc., was a reduction to practice of that composition of matter. Claims 1-4 are not as broad as that. They require not only that the composition be useful as a well drilling fluid, but that the natural asphalt be dispersible in oil, and that it substantially reduce the filtration loss. These are all positive limitations in the claims at bar.

It is submitted to be obvious that whether the referred to limitations are answered by a given composition of matter can be known only by testing the composition under suitable operating conditions in a well.

In other words, in actual effect, on the facts of the instant case there is really no difference as to what must be shown to establish reduction to practice of the process of claims 5, 6 and 7 or the composition of matter of claims 1-4. In this respect the case is similar to that of *Smith* v. *Bousquet,* 27 CCPA 1136, 111 F. 2d 157, which involved the question of reduction to practice of a claim for a composition of matter reading "An insecticide containing as its essential active ingredient phenthiazine." It was held that more was required to be shown to establish reduction to practice of the quoted claim than that a composition of matter had been produced containing phenthiazine. Tests had to be made to show that such composition of matter, after being produced, was effective under actual operating conditions as an insecticide.

On the facts stated, the Court ruled as follows:

> It would seem to be clear that in order to determine whether thiodi-arylamine and phenthiazine

> possess utility as insecticides for "codling moth" and "oriental fruit moth larvae" it would be necessary to ascertain by proper tests that those compounds, when "applied under outdoor conditions," would kill such pests without injury to the foliage.

Similarly, on the facts of the instant case, it is submitted that even the composition of claims 1-4 was not reduced to practice until actual tests in a well showed that the positive limitations of those claims were in fact satisfied by the composition produced.

On the point of the necessity of a test under operating conditions to establish a reduction to practice, the examiner cited (Joint Appendix, page 173) *Chittick* v. *Lyons,* 1939 C. D. 768, the same case being also reported in 26 CCPA 1382, 104 F. 2d 818. The Court distinguished the case from *Corona Cord Tire Co.* v. *Dovan Chemical Corporation,* 276 U. S. 358, relied upon heavily by appellant at pages 9, 30, 31 and 44 of appellant's brief, as to the sufficiency of laboratory tests.

The nature and extent of tests necessary to establish a reduction to practice was discussed by this Court in the case of *Seydeman et al.* v. *Thoma,* 32 App. D. C. 362. It seems obvious that in the case at bar the subject matter is not so simple that it can be said to be reduced to practice without any tests at all. It is further conceded that the authorities make it plain that mere laboratory tests may, under certain circumstances, be relied upon to establish a reduction to practice.

However, the subject matter of the claims at bar is certainly no simpler than the lubricating oil involved in the case of *Chittick* v. *Lyons, supra,* cited by the examiner. There although laboratory tests of the lubricant were made on an extreme pressure testing machine which had been designed in the research laboratories to do that type of testing, the court, nevertheless, noted that the serious question in our minds is whether the machine upon which the tests were made was shown to have been of a character which justifies a holding that the tests simulated actual service tests with sufficient closeness to constitute a reduction to practice.

Likewise, the subject matter of the claims at bar, considering the composition of matter claims alone, is no simpler than the subject matter of the claims for lubricating oil considered by this Court in the case of *Knutson et al.* v. *Gallsworthy et al.,* 82 U. S. App. D. C. 304, 164 F. 2d 497. There the appellant, citing the same case relied upon by the appellant in the instant case for the proposition that a composition of matter is reduced to practice when it is completely composed, contended that when he mixed a lubricating oil and a chlorinated paraffin wax, and found them miscible, he reduced to practice the composition of matter, and that no tests were necessary.

On the facts stated, however, this Court agreed with the Patent Office position that tests were necessary, stating as follows:

> The problem involved in the invention was the suitability of the product for usefulness, and not its mere production. So that the mere mixing of the two ingredients, without more, could not be deemed a demonstration equivalent to a reduction to practice.

Additionally, this Court agreed with the position of the Patent Office that both laboratory tests and actual service tests were necessary, since each type of test establishes different desirable properties of the oil composition.

In view of the foregoing, it is submitted that on the facts of the instant case tests in a well were necessary because claims 1-4 (Joint Appendix, page 82) are limited to "An oil-base well-drilling fluid * * *." These claims are not merely for a drilling fluid, as the argument at page 30 of appellant's brief might imply, where it is stated that "we have narrowed the issues in this case to the drilling fluid claims 1-4 * * *." Claim 1 is then quoted, referring to "App. 82," but the claim as quoted in appellant's brief omits the word "well" which appears in claim 1 of the application as given, correctly, in the Joint Appendix, page 82.

Of course, in the case at bar, it is clear that the record shows no test at all under actual service conditions in a well. However, we need not examine too closely in the case at bar as to whether laboratory tests alone may be relied upon to establish a reduction to practice.

6. In the case of *Corona Cord Tire Co.* v. *Dovan Chemical Corporation, supra,* relied heavily upon by appellant here as to the sufficiency of laboratory tests to show a reduction to practice, it is clear from the opinion in that case that the laboratory tests were adequately corroborated. In the case at bar there is no sufficient corroboration of the laboratory tests. Findings of Fact 13 and 14 (Joint Appendix, page 10).

Appellant presents the argument at page 23 of his brief that "Patent Office Rule 75 does not require any corroboration by another witness." The argument is true, but irrelevant here, because when appellant filed his complaint in the case at bar he was in the District Court, and not in the Patent Office, and became subject to the procedure in the District Court.

It is elementary in the courts of this jurisdiction that while an inventor is a competent witness in his own behalf, nevertheless, his uncorroborated testimony is not sufficient to establish conception of the invention, or of its reduction to practice. *Mergenthaler* v. *Scudder,* 11 App. D. C. 264; *Winslow* v. *Austin,* 14 App. D. C. 137, 141; *Garrells* v. *Freeman,* 21 App. D. C. 207, 212; *Kitchen* v. *Smith,* 39 App. D. C. 500, 503; *Mathieson Alkali Works, Inc.* v. *Crowley,* 78 U. S. App. D. C. 163, 138 F. 2d 281.

It is accordingly submitted that the District Court properly found, in Finding of Fact No. 14 (Joint Appendix, page 10) that "There was no sufficient corroboration of the laboratory tests to constitute a reduction to practice by the plaintiff Larsen even though the laboratory experiments, if properly proven, might be sufficient to constitute a reduction to practice under the law."

7. Notwithstanding the alleged reduction to practice in 1941, appellant waited three years to file his application in the Patent Office in 1944. The man who secretes his invention makes plainer the path of no one. He contributes nothing to the public. The law owes nothing to such an inventor. *Brown* v. *Campbell,* 41 App. D. C. 499.

The evidence clearly supports the Finding of Fact No. 15 (Joint Appendix, page 10) that "* * * at no time prior to the filing dates of the Miller applications did Larsen tell any one that the results of the laboratory tests convinced him that he had discovered a successful well drilling fluid of the character specified in the claims at bar." Appellant attempts to excuse his inactivity with respect to commercializing the invention or in filing an application therefor in the Patent Office, beginning at page 45 of his brief. Mention is made of lack of materials and of men. It was certainly unnecessary to buy any materials to file an application in the Patent Office on the invention, and thus secure at least a constructive reduction to practice of the invention, if appellant thought that he had anything successful at all.

It is accordingly submitted that, on the evidence before the District Court, it was properly held in Finding of Fact No. 16 (Joint Appendix, page 11) that "the fact that plaintiff Larsen waited for three years before filing his application weakens the effect of his testimony in establishing reduction to practice of the subject-matter of the claims in suit."

8. Although appellant attempts to show error on the part of the District Court in this finding No. 16 in the section of his brief beginning at page 44 thereof, nevertheless, it is submitted that the finding is a reasonable one on the evidence before the Court. Likewise it is submitted that all of the findings of the District Court are reasonable on the evidence before the Court. So far as this jurisdiction is concerned, a reasonable finding should not be set aside in the absence of clear error. *Besser* v. *Ooms,* 81 U. S. App. D. C. 7, 154 F. 2d 17, and long list of authorities cited therein under footnote 3; *Standard Oil Development Co.* v. *Marzall,* 86 U. S. App. D. C. 210, 181 F. 2d 280.

CONCLUSION

In consequence, it is therefore respectfully submitted that the judgment from which appeal has been taken is correct and should be affirmed.

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September 1951.

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No. 11,008.

APPELLANTS' REPLY BRIEF.

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT.

FILED [illegible]

CLERK

DELMAR H. LARSEN, NATIONAL LEAD COMPANY,
a Corporation, Assignee,
Appellants,

vs.

JOHN A. MARZALL, Commissioner of Patents,
Appellee.

Appeal from the United States District Court for the
District of Columbia.

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No. 11,008.

APPELLANTS' REPLY BRIEF.

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT.

DELMAR H. LARSEN, NATIONAL LEAD COMPANY,
a Corporation, Assignee,
Appellants,

vs.

JOHN A. MARZALL, Commissioner of Patents,
Appellee.

Appeal from the United States District Court for the
District of Columbia.

We will reply to Appellee's Brief under the same headings as appear therein.

Appellee's Statement of Questions Presented.

Appellee's Statement proceeds under option (b) of Rule 17 (e) (7); it is, however, questionable whether it complies with that Rule, since the Statement is exceedingly general and not "expressed in the terms and circumstances of the case" as required by reference to Rule 17 (c) (11) and as particularly applicable to this case.

The question of whether Appellant has satisfactorily shown that he completed the invention of the claims in suit

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Note: As in Appellant's Brief, the Joint Appendix will be referred to as "App.", the Transcript as "Tr.", Plaintiff's Exhibits as "Pl. Ex." and Defendant's Exhibits as "Def. Ex." All emphasis is ours.

prior to the effective dates of the Miller patents depends upon the questions stated in Appellant's Statement of Questions Presented. Appellee's Statement does not dispute that those questions are determinative of the issues in this case, involving as they do the application of Patent Office Rule 75.

Appellee's Counterstatement of the Case.

Appellee's Counterstatement of the case, p. 1, repeats the error first made in the opinion, App. 6, and repeated in Finding 4, App. 8, namely: that appellant "conceded" that for the purposes of this case the subject-matter of the claims was disclosed in Miller patents. We showed in Appellant's Brief, p. 16, that at the trial Plaintiff specifically did not "admit" that but simply "assumed" that preliminarily, and then we showed that actually such was not the case, as Appellant's Brief showed, p. 38, etc., considering the Miller patents and Larsen's testimony. That has been entirely ignored by Appellee's Counsel throughout their Brief.

The Counterstatement then relies wholly on the fact that Plaintiff has not established any reduction to practice before the effective date of the Miller patents, although in Appellant's Statement of Questions Presented, in Appellant's Statement of Points and in Appellant's Summary of Argument, Appellant's Brief pages 17-19 and later elaborated upon, we showed that **under the circumstances** of this case **actual reduction to practice** by Plaintiff before Miller filed **was not necessary**, but nevertheless was actually established. All that was again ignored by Appellee's Counsel.

The resume in Appellee's Brief, p. 2, again bases Appellee's entire case upon the fact that there was no actual reduction to practice by Larsen prior to Miller's filing dates and makes that "the issue before this Court," again disregarding the actual questions repeatedly stated in Appellee's Statement, Points and Summary.

Appellee's Summary of Argument.

Appellee's Summary of Argument, pp. 2-3, again disregards the actual questions in this case.

1. Appellee's Counsel really concede that there is no interference, as we also showed in Appellee's Brief, p. 22, quoting the colloquy in Court, App. 26, Tr. 22-23. But that concession is now coupled as follows: namely, that "this case involves no question of interference or originality." Later, by some peculiar species of argument, it is contended that, because this is not an interference, originality does not enter, although on other phases of this case Appellee's Counsel rely on decisions in interferences.

2. The Miller patents are prima facie bars to Appellant Larsen only if they actually disclose Larsen's invention, which was not conceded but controverted. Even so, however, the bars are immediately rebutted by the Findings 5 and 6, App. 8, that Miller's unauthorized descriptions in the applications and later patents could not be bars against Larsen because of his disclosure to Miller prior to Miller's filing dates.

3, 4. Assuming that an invention is not completed until it is both conceived and reduced to practice, there is no law that the latter will have to be prior to Miller's filing dates, where a question of originality is involved; indeed, the decision of this court in **Browning v. Johnson,** 50 App. D. C. 394, Appellant's Brief, p. 28, is to the contrary. Larsen actually filed his application within the statutory period of one year after the issue of the Miller patents, so that there was a constructive reduction to practice by that filing. Accordingly, in the absence of concealment of abandonment, neither of which is found by the Patent Office tribunals or by the District Court, Larsen is entitled to a patent.

5. Assuming that an actual reduction to practice by Larsen was necessary, even prior to Miller's filing dates, that is certainly shown by Findings 8 and 9, App. 9, by the application of the decisions of the Supreme Court, of this Court and other Courts, Appellant's Brief pp. 30, 34-36.

6. The contention that the tests were not properly corroborated is without force; for the District Court's Finding 13 is based upon the qualification that Ratcliffe "did not witness the tests," which was unnecessary in view of Ratcliffe's status with reference to both Larsen and Miller, Finding 5, App. 8; the legal situation is shown in Appellant's Brief p. 26, and Finding 8, App. 9.

7. The delay in commercializing or filing is really covered by Finding 15 and actually Larsen testified that the tests satisfied him, as they also did Ratcliffe; the testimony of both was quoted in Appellant's Brief, pages 33-34 and 25-26. Indeed, the concluding part of Finding 8, App. 9, establishes that the tests were successful.

8. The finding to which Appellee's Counsel refer, p. 3, is Finding 18, App. 11, that "the claims at bar are not patentable to the Plaintiff over the Miller patents." That is not a Finding of Fact, but a Conclusion of Law under the late decisions of the Supreme Court and of this Court in **A. & P. Co. v. Supermarket Corp.**, 340 U. S. 147, 156, and **Standard Co. v. Marzall**, 86 App. D. C. 210, 181 F. (2d) 280, 283, right.

Appellee's Summary of Argument is wholly silent on Patent Office Rule 75, although at the trial, Appellee's Counsel conceded:

> "It is wholly a question of Rule 75," App. 26, Tr. 23.

APPELLEE'S ARGUMENT.

We will discuss this Argument seriatim.

(1) **There is a question of originality in this case and no actual reduction to practice nor diligence by Larsen need be shown.**

Appellee's Counsel has confused a question of interference with a question of priority. There is no interference because there is no conflict in the claims as Appellee's Counsel, conceded at the trial colloquy quoted Appellant's Brief, p. 22.

There is, however, a question of originality as between Larsen and Miller as to Larsen's claims in suit because: **first** and generally, Larsen disclosed the subject-matter to others and demonstrated the utility of the same, all before Miller's filing date, Finding 6-9, App. 8-9; **second,** specifically Larsen actually disclosed the subject-matter to Miller himself as well as to Ratcliffe, who was the superior over both, and Miller actually carried out the demonstration under Ratcliffe's as well as Larsen's supervision and submitted his report to Ratcliffe, Findings 5-9. It will be obvious that the first involves a question of priority in general, while the second also involves a question of originality. That is something that Appellee's Counsel simply refuses to recognize, by contending that originality only arises in an interference proceeding, although no cases are cited supporting that assertion; there are none, but the reverse is true.

Of course, the purpose of that illogical statement is to overcome the decision of this Court in **Browning v. Johnson,** 58 App. D. C. 394, cited and applied in Appellant's Brief pp. 28-29, to the effect that where the question is one of originality, there need be no showing of reduction to practice or diligence. That is certainly the case here, when Larsen's application was filed within one year of the issue of a patent relied upon as a bar, R. S. 4886, 35 U. S. C. 31. Appellee's Counsel, however, simply ignore that statute.

The question of originality cannot be limited to interference proceedings from the very nature of our Patent Act. R. S. 4892, 35 U. S. C. 35, which requires the oath to state that the applicant believes himself to be "the original and first inventor or discoverer." It necessarily follows from that act, that if Larsen was the original inventor of what he claims, and Miller was not because Larsen disclosed it to Miller before Miller filed, as the District Court specifically found, then the Miller patents can constitute no bars to Larsen under Patent Office Rule 75 any more than in an interference proceeding. The Miller patents can only be statutory bars on the basis that they were issued one year prior to Larsen's application, which is not the case here.

The above is such fundamental law that nobody to the knowledge of Appellant's attorney has ever questioned it. In fact, there is only one old case on which we have been able to find any discussion, namely, **Kemp v. McBride**, 129 Fed. 382, Circuit Court in Massachusetts, in which the facts appear in the decision as follows:

> "The testimony before the court, however, is persuasive that, prior to any date on which defendant claims to have made an invention, the complainant **fully described and explained his whole invention to the defendant.** Kemp had made McBride his licensee under an earlier patent for another type of machine. In the course of negotiations relating to the license under this earlier patent, Kemp disclosed to McBride all his ideas relating to feed mechanisms, patented and unpatented, including the invention in controversy. He made sketches for McBride and explained in detail to him the feeder of the patent in suit. The testimony

> shows that he made these disclosures upon at least three different occasions between December, 1900, and June, 1901, and this was **before defendant** had produced any feed mechanism at all. The court must therefore come to the conclusion that the complainant was the first inventor of the device in controversy, and that the defendant obtained his information concerning the device from the complainant, and afterwards proceeded to put such invention upon the public."

From the above it will be clear that the Court's decision is based upon mere **disclosures** by Kemp to McBride, **without any reduction to practice** as the Patent Office, the District Court, and now Appellee's Counsel assert is necessary. The case was not only one involving originality, but indeed, was one in which Kemp antedated McBride; in other words, it was **analogous to a procedure under Rule 75**.

The contention of Appellee's Counsel that this case does not involve the question of originality and that such a question can only be raised in an interference proceeding is so illogical as to be without force.

(2) The Miller Patents actually do not disclose Larsen's invention.

We do not dispute that the effective dates of the Miller patents which Larsen was required to antedate are the filing dates. We, however, contend that where, as here, there is a question of originality involved, then upon a showing of mere disclosure by Larsen to Miller before Miller's filing date, as specifically found by the District Court, the filing of Larsen's application within a year of the Miller patent is sufficient. The fact that we went further and showed that there was also reduction to practice simply strengthened Larsen's case.

Nor do we contend that it was necessary for the Miller patents to actually assert Larsen's claims. The Board of

Appeals erroneously thought that such was a fact, although the basic erroneous character of the Board's decision was shown in Appellant's Brief, pp. 41-44. Such error is not disputed by Appellee's Counsel, who now rely upon a disclosure of Larsen's invention in the Miller patents and a concession of that by Appellant's Counsel, although we showed in Appellant's Brief, p. 16, there was no concession, but simply a preliminary assumption followed by a showing in the District Court that the Miller patents actually did neither claim nor disclose Larsen's invention. Appellant's Brief, pp. 38-41, on that phase is only given short shift, as will be seen later. What we contend is that the fact that Miller **did not claim** Larsen's invention is **a circumstance** to be considered in connection with whether the disclosures in the Miller patents were sufficient, as well as showing a **tacit admission** by Miller in his patents that he was not the originator of Larsen's invention.

The question is not one of "readability" of Larsen's claims upon the Miller patents; for as this Court said in **Smith v. Kingsland,** 85 U. S. App. D. C. 284, 178 F. (2d) 26, 28:

> "It is also true that claims must be read in the light of the specification, not to enlarge them, but to ascertain their meaning and the intention of the patentee with respect to them. . . ."

Again, Appellee's Counsel resorts to an asserted concession p. 5 by Appellant's Counsel in their Brief p. 39, but only quote an isolated part of what we said. The complete statement is as follows:

> "From the above, it will be seen that Miller **simply mentioned** gilsonite, manjak, glance pitch, and grahamite with natural lake asphalts; however, as noted above, the natural asphalt is claimed in Claim 4, App. 167, in combination with Miller's special air blown asphalts. **Miller's whole idea** was to cover a combination which would have a **high gel** as well as be an infil-

> tration preventor; his idea was **not** to use Larsen's idea of gilsonite, manjak, glance pitch, and grahamite, having a **zero gel** at zero filtration loss."

The last sentence can profitably be read in connection with what this Court said in Smith v. Kingsland, supra. That last sentence has not been disputed by Appellee's Counsel.

Becket v. Coe, 69 App. D. C. 53, 98 F. (2d) 332, is directly in point. It involved "a stain resisting iron base alloy having deep drawing properties," p. 333, and containing, in addition to iron, chromium, manganese, nickel and copper. In disposing of the prior art, the following statements are pertinent as applicable to the last sentence in Appellant's Brief quoted above:

> ". . . This type alloy is mentioned **only as a variant** of a chromium-nickel-manganese alloy, with neither details as to what different results would be obtained, nor any indication that the metal would resist staining." p. 335.
>
> ". . . One seeking a stainless deep-drawing alloy and finding the Hadfield (French) and Commentry (French) patents could not have said: 'These give me what I want.'" p. 336.

Miller did not want anything which gave a zero gel at zero filtration loss, but something which gave a low filtration loss with high gel, attained by employment of Miller's blown asphalt as distinguished from natural asphalt.

(3), (4) **Patent Office Rule 75 does not require reduction to practice by an applicant prior to the filing date of a patent cited, nor diligence, where the applicant disclosed to the patentee prior to the latter's filing date.**

Appellee's Counsel, pp. 5-6, has distorted Patent Office Rule 75 quoted from Appellant's Brief, pp. 22-23, and containing the expression:

> "the applicant shall make oath to facts showing a completion of the invention in this country before the filing of the application on which the domestic patent issued."

Appellee's Counsel first direct attention to Finding 17 that Plaintiff has not established any reduction to practice before the effective date of the Miller patents, then Counsel say:

> "An invention is not completed until it is both conceived and reduced to practice. Petersen v. Thomas, 56 App. D. C. 113, 10 F. 2d 908."

The language of the Court in that case is, however, as follows, 10 F. 2d, p. 908, right:

> ". . . Obviously such benefit will not flow from mere conception of an invention. Such conception must be completed—that is, reduced to practice—or there has been no gain to the public."

Then follows the usual rule that the first conceiver may prevail,

> "provided he couples his conception and reduction to practice through evidence of reasonable diligence."

It, therefore, follows that the expression "completion" of the invention cannot mean a reduction to practice before the filing of the application of the cited patent. While Rule 75 does not say anything about diligence, of course, that will enter if the applicant of the patent cited was a stranger to the affiant. However, where a question of originality is involved and the patentee obtained a disclosure from the affiant, then the question of diligence cannot enter any more than in an interference proceeding; **Browning v. Johnson**, 58 App. D. C. 394, cited and quoted from in Appellant's Brief, pages 28 and 29, obviously applies. The authority of that case has not been disputed by Appellee's Counsel, who contend only that originality cannot enter in a proceeding under Patent Office Rule 75, which has been shown to be erroneous.

In short, the situation here is as in Browning v. Johnson. As established by the District Court's Findings 5 and 6, App. 8, Larsen disclosed the subject-matter of his claims to Miller before Miller filed. Larsen thereafter filed his application, but within one year of the issue of the Miller patents. It is true there was a delay of about three years; however, there was a delay of **three years** in Browning v. Johnson; nevertheless, the Court decided in favor of Browning, because "the case turns upon the single question of **originality**," for Johnson derived the invention from Browning. As shown previously, Appellant's Brief, p. 42, neither the Examiner nor the Board of Appeals based their refusal of the patent upon any question of concealment or abandonment and neither did the District Court.

It will be apparent from the above that Larsen must prevail as against the Miller patents which can constitute no statutory bars. Accordingly, it was not really necessary to consider such questions as whether or not there was any reduction to practice by Larsen prior to the Miller filing dates, or whether the Miller patents disclose Larsen's invention.

From the above, the following in Appellee's Brief, p. 6, is therefore not determinative:

> "The controversy here is as to whether appellant proved a satisfactory reduction to practice."

We will, however, consider that question.

(5) Larsen actually reduced to practice prior to Miller's filing dates.

Appellee's Counsel concede the following, p. 7:

> "It is conceded here that tests by Miller, whatever such tests were worth, inured to the benefit of appellant."

Of course, that naturally followed from the District Court's Finding that Larsen and Miller were both in the employ of National Lead Company, to which the application in suit was assigned by the Plaintiff Larsen, who was Miller's superior, and that both were under the supervision of Ratcliffe, Finding 5; that Larsen directed Miller to make the tests after Larsen's disclosure to Miller, Findings 6 and 7; that Miller did proceed and complete the tests under Larsen's direction and under Larsen's observation, and that they were submitted to Ratcliffe, and that such tests demonstrated the utility of Larsen's invention, Findings 8 and 9. The legal situation conceded by Appellee's Counsel, supra, is well established in Agawam v. Jordan, 74 U. S. 583, 603; Brownstein v. Holmes, 30 App. D. C. 328, 1908 C. D. p. 345; P. Forrest v. Hartley, 56 App. D. C. 107, 10 F. (2d) 901.

It is, however, contended by Appellee's Counsel, p. 7, that the tests "were not sufficient to establish reduction to practice" because, as contended by the Examiner, there were "no actual tests on oil wells," App. 173, and by the District Court that the demonstration was not carried out "in a well," Finding 12, App. 10.

Findings 8 and 9 are, however, a complete answer to both. These not only state that at that time it was "the practice of testing drilling fluids **in accordance with** Recommended Practice on Standard Field Procedure" established by the American Petroleum Institute, "which was **standard practice** in the drilling fluid art"; that such procedure was at that time conducted by drillers "outside of the well," even "during the course of drilling a well," and that "because it was **impossible** to conduct those tests at the bottom of the well or along the well bore"; but that:

> "At that time drillers **relied upon such tests** conducted by laboratory apparatus outside of the well in order to determine the **utility and functioning** of a drilling fluid."

Finally, the District Court specifically found, Finding 8, App. 9, that the tests carried out and completed by Miller under Larsen's direction and under Larsen's observation, reported to Larsen and submitted to Ratcliffe, who was at that time skilled in the art of oil-base drilling fluids, "were conducted in accordance with" that practice and that:

> "such tests **demonstrated** that oil base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically **zero** filtration losses at low viscosities and gel strength and were superior to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt."

Is it logical to say that when it was impossible to carry out a test in the well, that Larsen should have been called upon to do the impossible? Is it logical to say that a test which demonstrated the utility of Larsen's invention did not establish that utility? The questions answer themselves; so does **Rogers v. Willoughby**, 55 App. D. C. 65, quoted from in Appellant's Brief, p. 34, and whose **application here has not been disputed.**

Again Appellee's Counsel, p. 7, relies upon a concession on Appellee's part that the District Court was correct as to the process claims and again it is an incomplete quotation from our brief when we said, Appellant's Brief, p. 3:

> "We want to note here that, as in the Motion for a New Trial, App. 12, we only rely on claims 1-4."

In that Motion we also stated, App. 13, repeated in Appellant's Brief, p. 30, that the law has made a distinction between a process on the one hand and a manufacture or composition on the other hand, as to what is necessary to complete an invention; that is what is necessary to constitute a reduction to practice after conception. That is not disputed by Appellee's Counsel. That, indeed, has been the ruling of the Board of Appeals as applied to an affidavit under Rule 75.

Ex parte Davies et al., 46 U. S. P. Q. 567, involves a process for the manufacture of **a pigment** preparation and such a pigment as a composition; the Board of Appeals says:

> ". . . The effective dates of each of these patents is prior to the filing date of the present application, but appellants have filed affidavits under Rule 75 showing the **introduction of the composition** into this country prior to the effective dates of these two patents and in view of this showing the examiner has withdrawn the rejection of claims 6, 7 and 9 directed to the composition on these references, but has held that appellants have failed to show the practice of the **process** prior to the filing dates of said patents."

In other words, in a proceeding under Rule 75, a mere importation of a composition was found sufficient to antedate a patent as to a composition claim.

However, Appellee's Counsel argue as to Larsen's composition, p. 8:

> ". . . They require not only that the composition be useful as a well drilling fluid, but that the natural asphalt be dispersible in oil, and that it substantially reduce the filtration loss. These are all positive limitations in the claims at bar."

It is not, however, disputed by Appellee's Counsel that natural asphalts are dispersible in oil, because it cannot be disputed that is a scientific fact. Nor do Appellee's Counsel dispute that the tests did "substantially reduce the filtration loss," because Finding 8 is that the tests

> "produced practically zero filtration losses and low viscosity gel strength."

The finding itself is a complete answer to Counsel's contention; for although they contend that "can be known only by testing the composition under suitable operating conditions in a well," that is completely answered by Finding 9 that "it was impossible to conduct those tests at the bottom of the well or along the well bore." Surely Counsel could not expect Larsen to do the impossible and when he did what was **then the practice** of conducting the tests outside of the well and by laboratory apparatus at that in the same way as they had been conducted since. That test was standardized in 1938, Ratcliffe App. 49, Tr. 60, three years before the demonstration in 1941, and that test was still in use in 1942 and used in exactly the same way, Pl. Ex. 3, App. 101.

Smith v. Bousquet, 111 F. (2d) 157, relied upon by Appellee's Counsel, p. 8, was a very special case in that it involved an insecticide for killing codling moth on foliage, in which a test had to be made **on foliage** in order to determine whether there would be **injury to the foliage**. So, of course, the test had to be under outdoor conditions on codling moth on foliage. That case was, however, modified by the same Court in:

Smith v. Swaine, 127 F. (2d) 140, C. C. P. A., again involving an insecticide, although applied to mosquito larvae, p. 142, as occurring in ponds. The tests there were carried out in the laboratory on water containing mosquito larvae. The Court says, p. 143:

> ". . . There is nothing in the Smith v. Bousquet case, supra, that would suggest that a test involving extermination of mosquitoes in a laboratory in water would not be satisfactory to prove reduction to practice of the involved invention merely because it was done in a laboratory."
>
> ". . . We do not think it necessary under such circumstances to test the insecticide on all species of mosquitoes or in all kinds of water."

Chittick v. Lyons, 104 F. (2d) 818, C. C. P. A., is again relied upon by Appellee's Counsel, p. 9, as it was by the

Examiner, although we distinguished from it in Appellant's Brief, p. 36. It is true as Counsel says the Court cites the Corona-Dovan case, but in finding it distinguishable therefrom, the Court had previously said as to the test made on lubricating oil:

> "**The only test,** if it may be called a test, given the batch of material was to drop some of it upon a piece of glass—seemingly a watch crystal—and observe the reaction" (p. 820).

Appellant's Counsel, however, do not dispute that in that case there was **no official** laboratory method, but that the only tests recognized was performance in service as appears from the Court's decision, pp. 821-822. Of course, a lubricating oil is used to reduce friction, and obviously some sort of machine has to be employed to determine that. **Here there was a standard test** which was not only used to determine the utility of Larsen's invention, but was **the only test which could be used** because of the impossibility of getting into the well. Appellee's Counsel have not made any contention of what was missing in such a test, and, of course, they could not expect Larsen to do the impossible.

We do not contend, as Appellee's Counsel seem to infer, p. 9, that no test is necessary in order to establish what an applicant has accomplished. Our contention is that the test was carried out in the way that had been done since it was standardized in 1938 as the only possible test, and that the Findings 8 and 9 are not only explicit that the test was carried out, but that they demonstrated that Larsen's invention

> "produced practically zero filtration losses at low viscosity and gel strength."

That is what is claimed here and that is what the Miller disclosures do not even hint at, but the very opposite, namely, zero filtration with substantial gel strength; Larsen showed why his invention permitted greater control, see Appellant's Brief, p. 7; that has not been disputed.

Knutson v. Gallsworthy, 82 App. D. C. 304, 164 F. (2d) 497, relied upon in Appellant's Brief, p. 10, was an entirely different case. That case again involved **a lubricating oil**, p. 503. Of course, we do not contend here that mere making up of a mixture was sufficient as this Court there rejected, p. 508, right. Morrell had made laboratory tests on **corrosion** which this Court found sufficient because the **Federal Specification** for lubricant so prescribed, p. 508, left; however, this Court was of the opinion that in addition to such corrosion tests, there should also have been tests under service conditions. That is, of course, natural, since as shown in Chittick v. Lyon, supra, there **was no standard test except** the service test for a lubricant. That is particularly so because of the particular lubricant which required service tests for the reason that, as stated by this Court in Knutson v. Gallsworthy, 164 F. 2d, at page 508:

> ". . . For these reasons, the Board held that it was necessary that it be demonstrated that the mixture possessed extreme pressure lubricating properties not possessed by the oil alone, and that tests were thus necessary."

That case can be distinguished from, viz., Chittick v. Lyons, by the fact that there was **no standard test** in either of the cases, while in this case there is not only a standard test prescribed by the industry, but the only one which could possibly be used.

(6) **This case is fully supported by the Corona-Dovan case.**

Corona v. Dovan Corp., 276 U. S. 358, was only distinguished from by Appellee's Counsel, p. 11, because in that case "the laboratory tests were adequately corroborated." But we are dealing here at this stage with a question of whether the standard test in this case is on a par with the "thumb and tooth" test in Corona v. Dovan and which the Supreme Court says, p. 384:

> ". . . This is not so exact a method in determining all the qualities that a test machine would show in the product, but it is, as already said, one very **generally used** for practical purposes in factories in determining that the vulcanization or cure is complete."

In other words, even though there was a better test than the thumb and tooth test, the Supreme Court nevertheless accepted that. Here the test used by Larsen is the only possible test which can be used, so certainly this case is a stronger case than the Corona-Dovan case. Appellee's Counsel has not disputed that, although we so asserted in Appellant's Brief, p. 31.

In Corona v. Dovan the patent was not simply for a chemical, but one of the claims read as follows:

> "A vulcanized compound of rubber or similar material combined with a vulcanizing agent and diphenylguanidine" (276 U. S., p. 366).

That is certainly on a par with Larsen's drilling fluid containing gilsonite, etc., and, as noted above, the District Court specifically found, Finding 8, App. 9, that the test "**demonstrated**" the utility of Larsen's invention.

Patent Office Rule 75 does not require corroboration.

We finally come to Appellee's Counsel's discussion of Rule 75. Here we find the following confession and avoidance, pp. 11-12:

> "Appellant presents the argument at page 23 of his brief that 'Patent Office Rule 75 does not require any corroboration by another witness.' **The argument is true,** but irrelevant here, because when appellant filed his complaint in the case at bar he was in the District

> Court, and not in the Patent Office, and became subject to the procedure in the District Court."

Again no authority is cited to support that strange position. We would naturally expect that the reverse would be true, that is, that the rule as to the sufficiency of evidence would be tightened where an attempt is made to take the claim away from another patentee, rather than include something not claimed by the patentee and not even clearly disclosed, and which has been proved as having been disclosed to him by the affiant under Rule 75. Fortunately, however, the Court passed upon that very question.

In re Grieve, 45 App. D. C. 524, 1917 C. D. 122, involved the sufficiency of an affidavit under Rule 75; the Court says, p. 127:

> "We come now to the Worm patent. The apparent object of Rule 75 is to require an applicant at least to make **a prima facie** showing of priority in order to overcome the references mentioned in the rule. Certainly where an applicant substantially complies with the rule his application should not be rejected summarily."

In other words, the Court recognized that in an affidavit under Rule 75, the purpose is only to establish **a prima facie case**; in other words, the Court makes distinction between an affidavit under Rule 75 and an interference proceeding where it is necessary to establish more than a prima facie case.

We have cited and quoted from, Appellant's Brief, p. 23, **Ex parte Leins**, 33 U. S. P. Q. 446, 447, a decision of the Board of Appeals, that heretofore the Patent Office has not required corroboration of an applicant's affidavit under Rule 75. As to what satisfies the Patent Office on the question of "completion of the invention" under that Rule, again the view of the Board of Appeals is expressed in a recent decision in:

Ex parte Merz, 75 U. S. P. Q. 296, when the Board in considering the sufficiency of an affidavit by the applicant under Rule 75 said, p. 297:

> "... The process followed in the experiment is the same as that recited in claim 1, and there is a showing that sulfuryl chloride was produced even though only a few drops. Rule 75 does not require that the affidavit show that the process was practical from a commercial standpoint. Appellant in his affidavit has made a showing that he practiced the claimed process and obtained sulfuryl chloride prior to the filing date of the Iler patent. This we hold to be a sufficient showing of fact to satisfy the requirements of Rule 75."

We do not dispute that in interference cases the uncorroborated testimony of an applicant, a party to the interference, is insufficient to establish either conception or reduction to practice, because in such a case a claim of an adverse party claiming the monopoly is taken away from him if the applicant succeeds. Where, however, as specifically stated in Rule 75, the applicant "does not claim the subject-matter of a patent cited against him as a statutory bar," then the situation is entirely different; for as stated by the Court, In re Grieve, supra, only "a prima facie showing of priority" is necessary. That we have shown here; certainly when, as specifically found by the District Court, the subject-matter of Larsen's claims was disclosed by Larsen to Miller before he filed his applications.

In **Kitchen v. Smith**, 39 App. D. C. 500, 1913 C. D. 335, an interference proceeding, relied upon by Appellee's Counsel, p. 12, the Court said, p. 337:

> "The substantial question is, was Smith corroborated in respect of holding back his invention while working out the problem above mentioned? As held by the Commissioner, corroboration may exist in **estab-**

> **lished circumstances** admitting of satisfactory **inference.** The improvement worked out in the mind of Smith found expression in **his later drawing** which became a part of his application. The Patent Commissioner considered this an important feature of the invention described; and that it is so is attested by the fact that it was the subject of several claims that were allowed, but which are not embraced in the interference."

A comparison of the tests in Miller's report to Larsen and Ratcliffe, Pl. Ex. 13, App. 140, 145-149, with those in the Larsen application, Pl. Ex. 1, App. 76, 80, shows that those tests are **carried forward** in Larsen's application and, of course, in the claims in suit.

(7) **There was no concealment by Larsen as against adverse rights, there was no such Finding, and Larsen did not unduly delay his application.**

On the question of Larsen's delay in filing his application, discussed in Appellant's Brief, pp. 12 and 13, Appellee's Counsel cite Brown v. Campbell, 41 App. D. C. 499, 1914 C. D. 170. That case involved, as stated in the decision, a question of **concealment** and the Court relied upon Mason v. Hepburn, 29 App. D. C. 485, which together with Lederer v. Walker, 39 App. D. C. 122, was discussed in Appellant's Brief, pp. 47-48, but which decisions were simply ignored in Appellee's Brief. **Those cases, of course, involve concealment as against adverse rights of another who independently had conceived the invention.** There has been no such finding here.

Appellee's Counsel overlooked the following:

First. There was no concealment by Larsen; in fact, the District Court specifically found, Findings 5-10, that Larsen disclosed the invention to Miller, who then proceeded under Larsen's supervision, with both under the supervision of Ratcliffe, to conduct tests on Larsen's invention which "demonstrated" Larsen's invention.

Second. Neither the Examiner nor the Board of Appeals relied upon any concealment; in fact, the Board of Appeals specifically says, App. 177:

> "The Examiner's rejection was not based on the Mason v. Hepburn doctrine."

The answer did not rely on any concealment, because Paragraph 7, App. 4, relies upon "the reasons as given by" the Examiner and the Board of Appeals. The District Court did not find any concealment by Larsen, either in his opinion, App. 5-6, or in his Findings; in the opinion is substantially repeated in Finding 16, the District Court said, App. 6:

> ". . . And it may be added that the fact that plaintiff waited for three years before filing his application weakens the effect of his testimony."

It may be added here that in **Kitchen v. Smith**, 39 App. 500, 1913 C. D. 335, involving the general question of diligence, the Court said, pp. 337-338:

> ". . . From the very nature of the subject diligence cannot be measured by an arbitrary standard, but is to be determined in each case **by its particular circumstances.** The case more nearly resembles O'Connel v. Schmidt (C. D. 1906, 662, 122 O. G. 2065, 27 App. D. C. 77) than others cited."

In **O'Connell v. Schmidt**, the Court specifically said, 1913 C. D. 44:

> ". . . **We know no rule** which, under the circumstances of this case, requires an inventor to rush to the Patent Office in order to preserve his rights as the first inventor."

In **Ex parte Merz**, 75 U. S. P. Q. 296, supra, involving, as noted above, an affidavit under Rule 75, the Examiner took the following position, answered by the Board of Appeals as follows, p. 297:

> ". . . The examiner has held the affidavit insufficient on the ground that the experiment described in the affidavit was not a completion of the invention but amounted to nothing more than an abandoned experiment, as evidenced by the fact that this application was not filed until **more than four years** had elapsed after the experiment was performed.
>
> "It appears to us to be well settled that the mere lapse of time between the completion or reduction to practice of an invention and the filing of an application thereon does not constitute abandonment."

Ex parte Austin, 72 U. S. P. Q. 384, also involved an affidavit under Rule 75. The Board of Appeals in reversing the Examiner said, p. 386:

> "We have carefully considered the examiner's reasons for not accepting the affidavit under Rule 75 and cannot agree therewith. The decisions cited by the examiner are inter partes cases wherein the rights of another party were involved and prejudiced. There is **nothing in Rule 75**, or in the cases cited by the examiner, to indicate that the doctrine set forth therein **applied to ex parte cases** and it seems to us that in such cases, once the invention has been reduced to practice, **abandonment must be affirmatively proven.*** In view of this holding Carothers (2) is not a valid reference."

From the above it is clear that this Court as well as the Patent Office has recognized a distinction between an interference proceeding and a proceeding by affidavit under

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* R. S. 4886, 35 U. S. C. 31, specifies "unless the same is proved to have been abandoned."

Rule 75, which latter requires only "a prima facie showing of priority," and that abandonment must be proved.

Finding (15) is contrary to the evidence because the tests convinced Larsen and Ratcliffe.

Appellee's Counsel in their Brief stress Finding 15, App. 10, the last sentence of which finds, App. 10-11:

> ". . . Miller's report dated March 17, 1941, of the laboratory tests were submitted to Ratcliffe, but at no time prior to the filing dates of the Miller applications did Larsen tell any one that the results of the laboratory tests **convinced him** that he had discovered a successful well drilling fluid of the character specified in the claims at bar."

Appellee's Counsel, however, entirely ignore the testimony of Larsen and of Ratcliffe quoted in Appellant's Brief, pp. 33-34: By Larsen, **"I thought it was quite successful"** and "I am willing to believe that I did discuss it with my superiors"; and Ratcliffe's testimony that in his opinion that test was **"a practical demonstration"**; Ratcliffe's answering:

> "Yes, we can tell from the test whether these materials will work in drilling mud,".

Finding (8) specifically found that Larsen's tests demonstrated Larsen's invention and therefore constituted a reduction to practice prior to Miller's filing dates.

Finally, Appellee's Counsel utterly ignore the District Court's Findings 8-9, App. 9, in which the last part of Finding 8 specifically finds:

> ". . . such tests **demonstrated** that oil base drilling fluids containing gilsonite, manjak, glance pitch and grahamite produced practically **zero** filtration losses at low viscosities and gel strength and were **superior**

> to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt.''

That is substantially repeated in Larsen's claims, of which the broadest claim, App. 82, reads as follows:

> ''1. An oil-base well-drilling fluid containing a natural asphalt of a type and character dispersible in oil and chosen from the group consisting of gilsonite, manjak, glance pitch and grahamite, in an amount sufficient to substantially reduce the filtration loss.''

It is difficult to conceive, that when the District Court specifically found that the tests ''demonstrated'' what is stated in the broadest claim and prior to Miller's filing dates, there should be any question about whether the District Court did not actually find a reduction to practice under the law as laid down in the decisions of the Supreme Court, of this Court, and other Courts cited and applied in Appellant's Brief, pp. 30-36, and no one of which was even referred to by Appellee's Counsel; in fact, they are simply ignored.

The District Court's error was really one of law, because of failure to apply the law to the facts even as actually laid down by the Courts, which Appellee's Counsel has seen fit to ignore.

Larsen's delay in filing his application did not weaken his testimony of reduction to practice.

Appellee's Counsel, after relying on the last sentence of Finding 15, which is shown to be contrary to the evidence, rely upon Finding 16, which for convenience is repeated, as follows:

> ''16. The fact that plaintiff Larsen waited for three years before filing his application weakens the effect of his testimony in establishing reduction to practice of the subject-matter of the claims in suit.''

Of course, this Finding is without force if, as is established by the decision of this Court in **Browning v. Johnson,** 50 App. D. C. 394, supra, no reduction to practice or showing of diligence is necessary, where as here, the case is one of **originality**; or if Larsen **actually reduced** his invention to practice under the decision of the Supreme Court and of this Court in **Corona Co. v. Dovan,** 276 U. S. 358, 384, and **Rogers v. Willoughby,** 55 App. D. C. 55, supra; or when Rule 75 **does not require corroboration** by another witness, **Ex parte Leins,** 33 U. S. P. Q. 446, 447, supra, and conceded by Appellee's Counsel in their Brief, p. 12; or if **Ratcliffe actually corroborated** Larsen as to the tests, Wigmore on Evidence, 1904 edition, Vol. I, pages 1887, 1889 and 1890, supra. All of those authorities were discussed and quoted from in Appellant's Brief, and Appellee's Counsel have not disputed their authority on the questions involved here; in fact, with the exception of the Corona-Dovan case, they were simply ignored, except the concession that corroboration is not required under Rule 75.

However, apart from the above, Appellee's Counsel simply ignore the situation facing Larsen's Assignee, which is set out in the District Court's Finding 15, App. 10, and elaborated upon in Appellant's Brief, pages 45 and 46, none of which was disputed. Appellee's Counsel simply content themselves with the following statement:

> ". . . It was certainly unnecessary to buy any materials to file an application in the Patent Office on the invention and thus secure at least a constructive reduction to practice of the invention, if appellant thought that he had anything successful at all."

As to the last part of that statement, seeking to explain Finding 15 previously discussed, we have shown that that was contrary to the evidence.

Now, as to the remaining part, Appellee's Counsel have not distinguished from **Sinko v. Automatic Corp.,** 152 F.

2d 974, C. C. A. 2, that no inference is to be drawn from failure to file an application. Nor have Counsel distinguished from the statement by the Court in **O'Connell v. Schmidt**, 27 App. 77:

> ". . . **We know no rule** which, under the circumstances of this case, requires an inventor to rush to the Patent Office in order to preserve his rights as the first inventor."

That case was relied upon on the question of diligence in filing an application in **Kitchen v. Smith**, 39 App. D. C. 500, cited in Appellee's Brief, p. 12, and quoted from p. 20, supra.

The above is particularly applicable here because of the fact that **Miller was an interloper**, who included in his applications something which the District Court specifically found, App. 8 and 9, had been not only disclosed to him by Larsen prior to his filing dates, but which Miller knew had been successfully demonstrated, as the District Court also found. Finally, **Miller's lack of originality**, as against Larsen's originality, of the subject-matter of the claims is supported by the fact that Larsen's invention is not disclosed in the Miller applications and not claimed at all, although the Board of Appeals thought that the latter was the case, but which we have shown in Appellant's Brief, pp. 41 and 42, was erroneous and which error is not disputed by Appellee's Counsel.

Besser v. Ooms is not applicable here and refusal of a patent on the claims in suit to Larsen constitutes error.

Finally, Appellee's Counsel resort to **Besser v. Ooms**, 81 App. D. C. 7, 154 F. 2d 17, which is a favorite decision of the Patent Office to dispose of a case, although that was a case of straight anticipation and not one involving the application of Rule 75, and particularly not a question of originality. That that decision was not all sweeping is apparent from this Court's citation in the footnote, 154 F. 2d 18, of:

Poulsen v. Coe, 73 App. D. C. 324, 119 F. 2d 188. That case reversed the Patent Office, this Court stating:

> "Since in our view the findings and conclusions of the trial court and the rulings of the Patent Office were in clear error on the question of anticipation, and since we think it clear also that the appellants' advance was inventive in character, we are obliged to reverse in respect of claims 72, 73, 74, 76, 77, 78 and 79. Abbott v. Coe, 1939, 71 App. D. C. 195, 109 F. 2d 449" (p. 200).

That is certainly applicable to this case, because it is entirely clear that the rulings of the Patent Office and of the District Court in refusing a patent to Appellant were in clear error. It really all simmers down to **a question of law,** because the District Court's Findings 5-9 establish such a situation where the District Court erred on a question of law, by failure to apply the decisions of the Supreme Court and of this Court to the facts which he found to be true. As to the last part of Finding 15, we have shown that to be contrary to the evidence, Appellee's Counsel have not disputed that.

Abbott v. Coe was also distinguished from recently in Broderson v. Marzall, No. 10,631, this Court stating:

> "Nevertheless, when our view of the record has required it, we have reversed. Thus we did so in Poulsen v. Coe, two of the three judges who sat in Abbott v. Coe participating . . . "

The Standard Oil Development Co. v. Marzall, 86 App. D. C. 210, 181 F. 2d 283, cited in Appellee's Brief, p. 13, involved a question of patentable invention which this Court says, p. 283, "is a question of law." The question **of patentable invention** and the facts on which that is based are **entirely different** from a question of whether the evidence shows certain things on a **question of originality.** Here, as noted above, the Findings of Fact of the District Court are such as to show that the Court erred on a question of law by not properly applying the decisions of the Supreme Court and of this Court to the facts which he found to be true.

Mathieson Alkali Works v. Crowley, 78 App. D. C. 163, 138 F. 2d 281, which was cited in the District Court's Opinion, App. 6, was not relied on by Appellee's Counsel. Although that was an interference case, this Court specifically said, pp. 281-282:

> ". . . **We have warned against** the arbitrary or extreme use of a rule making visual observation the test of corroboration."

Here the real basis of the District Court's Finding 13 is that Larsen's laboratory tests were not corroborated by Ratcliffe as to the tests because:

> "Ratcliffe . . . did not witness the tests."

In that Finding, however, the District Court did find, as he did in other Findings, namely:

> ". . . Both Larsen and Miller were under the supervision of George L. Ratcliffe, Manager of Baroid Sales Division of National Lead Company" (Finding 5).
>
> "8. Thereafter said Miller proceeded with such tests under Larsen's direction and under Larsen's observation and completed the same and reported the same to Larsen in writing on March 17, 1941, and said written report of said laboratory test was submitted to Ratcliffe, who was at that time skilled in the art of oil base drilling fluids" (Finding 8).

Ratcliffe testified and was not disputed:

"Q. Now, in your opinion, was that **a practical demonstration** of those various natural asphalts mentioned

> in there? A. Do you mean that I could tell from here that those worked or just exactly——
>
> Q. **Yes,** whether they worked in drilling fluids as far as filtration? A. Yes, we can tell from the test whether these materials will work in drilling mud," App. 49-50, Tr. 61.

Nor was that Mathieson case one of originality as here, where as specifically found by the District Court, Larsen had disclosed the invention to Miller, who was then set to work to do the testing under Larsen's direction and observation, all prior to Miller's filing dates.

In the Mathieson case, as stated by this Court, p. 282:

> ". . . The District Court properly challenged its application as a matter of law."

As appear from the facts in the above case, the District Court was entirely right as found by this Court, because of **the facts as there presented,** which are totally different from the facts that we have here. As this Court observed in that case, the inventor's testimony was "**without cross-examination.**" Here both Larsen and Ratcliffe were cross-examined.

There the applicant Cunningham's own testimony was **exceedingly uncertain,** as appears from the following statements by this Court:

> ". . . In Cunningham's testimony concerning his notebooks and reports, and in the notebooks and reports themselves, he referred to his experiments as revealing **a possibility** which justified further study, rather than a reduction to practice" (p. 282).
>
> ". . . Testifying by deposition, on November 4, 1937, he used the significant language: ' . . . the method **now used** to produce sodium sulfide,' to describe the pre-existing method which his discovery was supposed to have superseded by reduction to practice before June, 1935" (p. 282).

Here, Larsen specifically testified as to the test: **"I thought it was quite successful,"** App. 66, Tr. 90-91; and he produced the tests themselves which were submitted to Ratcliffe as the District Court found.

There the corroborating witness Taylor was simply Cunningham's "superior and employee" of Mathieson, and it does not appear that he was like Ratcliffe, skilled in the art of oil base drilling fluids, as found by the District Court, Finding 8. But even then Taylor **was not really familiar** with the subject-matter at all, because, as stated by this Court, p. 282, "he indicated **some doubt** as to his understanding of the process," and confessed that he was **"a little vague"** on what Cunningham had done and testified on what "can be reduced" and "in terms of **possibilities,**" etc. In such a situation this Court concludes as follows, p. 283:

> ". . . While it is possible, by piecing together some of Cunningham's statements and some of Taylor's comments thereon—and by disregarding others—to make a reasonably persuasive case for reduction to practice, that is far from sufficient to justify setting aside the findings of the trial court and its conclusions based thereon."

Such is not the case here at all. Not only were the laboratory tests submitted to Ratcliffe, who was at that time skilled in the art of oil base drilling fluids, as the District Court specifically found, but he gave a direct answer to whether in his opinion "that was a practical demonstration" by stating:

> "Yes, we can tell from the test whether these materials will work in drilling mud," App. 49-50, Tr. 61.

Finally, the District Court in this case specifically found:

> ". . . such tests **demonstrated** that oil base drilling fluids containing gilsonite, manjak, glance pitch and

> grahamite produced practically **zero** filtration losses at low viscosities and gel strength and were **superior** to oil base drilling fluids containing Trinidad asphalt or steam refined asphalt."

That should really settle the matter, certainly as far as concerns a proceeding under Rule 75 and as distinguished from an interference proceeding. This Court at least warned against "making physical observation of the tests was corroboration." That is the basis of the District Court's Finding in rejecting Ratcliffe's corroboration, because Ratcliffe "did not witness the tests." The other reason given by the Court in rejecting reduction to practice is that given in Finding 12, because there was no "actual use . . . in a well." That is directly contrary to the decision of the Supreme Court in the Corona-Dovan case and of this Court in the Rogers-Willoughby case, both supra. The Corona case did not even involve a question where there is an impossibility of performing a test under actual service conditions, as the District Court found to be so in Finding 9 and as this Court found in the Rogers case.

Conclusion.

We respectfully submit that the District Court erred in refusing a patent to Larsen on the claims in suit and should be reversed.

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